

**STORMWATER MANAGEMENT PLAN
and
STORMWATER MAINTENANCE PLAN**

**25569 Rua Michelle
Escondido, California 92026**

Grading Permit L-14349 CP 14636

ER02-08-054

Prepared For

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1.0 EXECUTIVE SUMMARY

The proposed project is a graded lot of 5,200 square feet on 5.2 acres. The project is located between Rue Michelle and Rue Montreux in Escondido, County of San Diego, California. This report is provided in response to the requirements of the County's Stormwater Management Ordinance for an Extended Initial Study on stormwater impact/water quality to complete the CEQA Environmental Initial Study. The information provided follows the guidelines as outlined in Section 4.1 of the County's Stormwater Management Plan and Section 4.1 of the County's Stormwater Maintenance Plan (see references).

The proposed project can be built to be in compliance with the County's guidelines for a Stormwater Management Plan. This analysis details post-construction stormwater protection through Best Management Practices (BMP's) and ensures the BMP's are effective with proper maintenance.

2.0 INTRODUCTION

2.1 Project Location and Existing Features

The project is located between Rua Michelle and Rue Montreux. The address is 25569 Rua Michelle, in the northwest section of Escondido, in the unincorporated area of the County of San Diego, California. The project site is situated in the gently rolling hills of north Escondido. Figure 1, in the attachments, provides a regional map of the area. Figure 2 is the street map of the local area. Figure 3 is the Satellite Aerial Photograph. Figure 4 is a USGS Topographical Map. Figures 5 and 6 are current photographs taken at the site. Figure 5 looks east/southeast and south and Figure 6 looks southwest.

Light residential development presently surrounds the project location. The slope on the property is variable from roughly 5 to 18 percent with one main watershed and another just offsite. The watershed on-site flows predominantly southwest, while the drainage just-offsite flows in a southerly direction. A newly built private roadway near the eastern boundary of the property will serve to increase runoff from the off-site watershed.

2.1.1 Soil Characteristics

According to the Soil Survey by the United States Department of Agriculture, the site is primarily composed of Cieneba-Fallbrook rocky sandy loam with 9 to 30 percent slopes, eroded (CnE2); with some boundary regions consisting of Fallbrook-Vista sandy loam at 9 to 15% slopes (FvD). The soil types fall in both B and C hydrologic groups. These soil types are considered to have moderately slow infiltration rates and moderate to high erodibility.

2.1.2 Land Use

Residential single-family dwellings surround the site on the north and west. A County easement forms the eastern boundary of the property, and alongside it runs a private road. The site can be accessed from the north via Rua Michelle.

The general plan designation for the area is residential number one. The property is zoned RR-1, Rural Residential, with a one acre minimum lot size. The assessor's parcel number (APN) is 187-520-11-00. The legal description of the property is: Section 32-11-2W, any que, Parcel 2, County of San Diego, State of California.

2.2 Project Description

The existing project area has been graded. The property elevation ranges from 860 to 946 feet above mean sea level. The project is higher in elevation than the adjacent property to the south and lower in elevation than the adjacent property to the north. On the western portion of the project site, there will be a graded upward southwest to northeast slope of 7.5 %. From the southwest corner of the property, the slope changes towards the northeast up to an elevation of 910 feet.

As proposed, the site will increase its impervious area, consisting of a residence and a driveway, by approximately 4,000 square feet. This is approximately a 2% increase in the amount of impervious surface after construction of the proposed project. Direct access to the project will be provided by Rua Michelle, on the northern boundary of the property.

Offsite water flows across this site as a result of the watershed on the northern boundary of the property. As a result of the newly built private roadway to the east, additional off-site development, and the increase of impervious area on-site (if developed), runoff potential will be increased. BMP's will be put in place to mitigate runoff from the two watersheds and the exacerbating effect of the road surface. The project is designed to keep as much storm water on the project as possible. The hydrology report concluded that the project would not generate significant water runoff, though a small increase will likely occur in the three drainage areas.

The project is proposing additional BMP's to control the limited surface runoff flows.

3.0 ENVIRONMENTAL SETTING / PROJECT WATERSHED

The project is located in the San Diego Region, in the County of San Diego, California. This region, approximately 3,900 square miles, encompasses most of San Diego County and parts of southern Riverside County and southwestern Orange County. The region is bounded by the hydrologic unit near Laguna Beach on the north, by the Laguna and lesser-known mountains on the east, by the Mexican border on the south, and the Pacific Ocean on the west. The San Diego Region is divided into 11 major hydrologic units (HU); San Juan, Santa Margarita, San Luis Rey, Carlsbad, San Dieguito, Penasquitos, San Diego, Pueblo San Diego, Sweetwater, Otay, and Tijuana (Figure 8). These HUs are broken into 54 hydrologic areas (HA), and 147 hydrologic subareas (HSA).

The proposed project is located in the Carlsbad watershed (HU 904.0), a triangular area of about 210 square miles (Figure 9). This watershed extends from Lake Wohlford on the east to the Pacific Ocean on the west with Vista on the north and Cardiff-by-the-Sea on the south. The creeks in the area include Buena Vista, Aqua Hedionda, San Marcos, and Escondido with four coastal lagoons; Buena Vista, Aqua Hedionda, Batiquitos, and San Elijo. The Carlsbad Hydrologic Unit is comprised of six hydrologic areas; the Loma Alta, Buena Vista Creek, Aqua Hedionda, Encinas, San Marcos, and Escondido Creek Hydrologic Areas (Table 1).

The project site lies within the Escondido Hydrologic Subarea (904.62). This 5.2-acre site represents approximately 0.0100% of the 54,112 total acres of the Escondido Creek HA (904.60), the hydrologic area of which it is a part.

The Escondido Creek watershed flows west through Escondido (HSA 904.62) to San Elijo Lagoon (904.61), approximately 17 miles to the southwest.

**Table 1. Hydrologic Subareas in the Escondido Creek Hydrologic Area
(HA 904.60)**

Basin Number	Hydrologic Basin	
904.61	San Elijo	HSA
904.62	Escondido	HSA
904.63	Lake Wohlford	HSA

4.0 POTENTIAL EFFECTS TO THE WATER QUALITY ENVIRONMENT

4.1 Identification of Pollutants and Conditions of Concern

The drainage from the site will flow to the southwest, approximately 17 miles toward San Elijo Lagoon (4.61), at the mouth of Escondido Creek (4.63). The Pacific Ocean lies approximately one mile further west.

Possible post-construction pollutants from the project area include sediments, nutrients, trash and debris, oxygen demanding substances, oil and grease, bacteria and viruses, and pesticides from potential sources that include the lot, driveway, and the nearby roadways. Table 2, below, lists the water body's anticipated contaminants, sources, water body types and impaired beneficial uses.

Table 2. Water body's Anticipated Contaminants, Sources, Types and Impaired Beneficial Uses

Hydrologic Unit	Watershed	Major Water Bodies	Water body Type	Pollutant/ Stress	Sources	Impaired Beneficial Uses	TMDL Priority
904.00	Carlsbad	Pacific Ocean, Escondido Creek HA (904.60)	C	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2	Low

Rec-1 = Contact Water Recreation – Recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and SCUBA diving, surfing, white water activities, fishing, or used of natural hot springs.

Rec-2 = Non-contact Water Recreation – Recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited it, picnicking, sunbathing, hiking, beachcombing, camping, boating, tide pool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

C= Coastal Shorelines

4.2 Beneficial Uses of Surface Waters and Ground Waters

Table 3 details the beneficial uses for the surface and ground waters surrounding the project site within the Carlsbad watershed as outlined in Table 2-2, *Beneficial Uses of Inland Surface Waters*, in Chapter 2 of the Water Quality Control Plan for the San Diego Basin (9).

Table 3. Beneficial Uses Within the Carlsbad Watershed

Beneficial Uses	Inland Surface Waters	Coastal Waters *	Ground Water
Municipal and Domestic Supply	X		X
Agricultural Supply	X		X
Industrial Service Supply	X	X	X
Navigation		X	
Hydropower Generation	X		
Contact Water Recreation	X	X	
Non-Contract Water Recreation	X	X	
Commercial and Sport Fishing		X	
Warm Freshwater Habitat	X	X	
Cold Freshwater Habitat	X		
Estuarine Habitat		X	
Wildlife Habitat	X	X	
Biological Habitats of Special Significance		X	
Marine Habitat		X	
Migration of Aquatic Organisms		X	
Aquaculture		X	
Shellfish Harvesting		X	
Spawning, Reprod. and/or Early Dev.		X	

* Coastal beneficial uses are for San Elijo Lagoon and the Pacific Ocean.

5.0 CHARACTERIZATION OF PROJECT RUNOFF

5.1 Storm Water Quality at Outfall(s)

One storm water outfall is proposed near the southwest corner of the property. This outlet will flow into a drainage area and exit the property to the southwest. Channels do not currently exist in this area; water sheet flows naturally in a southwest direction to this point, and the design will serve to decrease runoff velocity across to the adjoining property.

5.2 Tributary Drainage Area to Outfall(s)

The project flows into the Carlsbad watershed, as discussed under section 3.0-Project Watershed. As mentioned the watershed flows west toward San Elijo Lagoon, at the mouth of Escondido Creek, and to the Pacific Ocean.

5.3 Site Hydrology

According to the drainage study prepared by Eilar Associates under the supervision of Michael Alberson, a San Diego County Registered Stormwater Management Consultant, the project can be broken down into three drainage areas identified in the hydrology report as Drainage Area A through Drainage Area C (Appendix A). Drainage Area A exits the property to the southwest. Drainage Area B exits the site at the northwestern boundary. Drainage Area C exits along the southern and southeastern boundary.

Because the rainfall volumes are so low, the Q-100 year average was calculated instead of ten-year average rainstorm flow volumes. The calculated Q-100 for each of the drainage areas A through C, both pre-construction and post-construction with mitigation, are in the following table.

Drainage Area	Pre-developed "Q" in cubic feet/second (cfs)	Proposed Post-developed "Q" with mitigation measures in cubic feet/second (cfs)
"A"	6.10 cfs	7.06 cfs
"B"	3.89 cfs	3.89 cfs
"C"	3.22 cfs	3.22 cfs

Drainage Areas A, B, and C cover undeveloped, graded, and potential development areas on-site. The cumulative effect of runoff due to these drainages is addressed both prior to and after development.

The Stormwater Management Plan addresses the issue of increased flows due to this development and makes several recommendations to reduce stormwater velocity and increase infiltration of water into the site. These are covered under section 6.0 - Mitigation Measures to Protect Water Quality.

6.0 MITIGATION MEASURES TO PROTECT WATER QUALITY

Single-family detached residential developments are required to address Site Design BMP's, Source Control BMP's, and Structural BMP's. Three specific areas must be addressed:

- Private Road
- Residential Driveways
- Hillside Landscaping

The proposed BMPs for the project will address site design, source control, and natural and structural treatment controls to protect water quality and reduce erosion to the maximum extent possible (MEP).

6.1 Site Design

As proposed, the site will increase the impervious surfaces, composed of a residence and driveway, by approximately 4000 square feet. This is approximately a 2% increase in the amount of impervious surface after construction of the proposed project.

Site design was done to retain as much water on the property as possible. This includes designing the project grading to direct all storm water to the southwest drainage and driveway.

A majority of the property is proposed as open space. A concrete pad and temporary structure currently exist on the south slope on the central eastern portion of the property.

6.2 Source Control BMPs

All storm drain inlets and catch basins within the project area will be marked to discourage illegal dumping with signs containing prohibitive language. A tile or plaque will be installed stating "NO DUMPING – I LIVE IN THE CARLSBAD WATERSHED."

A Homeowner's informational packet will be produced and distributed to new owners and tenants to educate them in controlling the pollutants that could go into the drainage and stormwater. An example of this material is presented in Appendix C.

6.3 Structural Treatment BMPs

To help reduce stormwater velocities, the hydrology report recommended an increase of green space around building sites and, where feasible, driveways to remain as gravel or to use porous pavers or permeable porous concrete to allow for maximum infiltration which will reduce the overall impermeability of the project.

A drainage inlet is proposed at the top of the slope at southwestern corner. The drainage inlet will pipe water down the slope into a riprap area that disperses the water into the existing drainage.

All storm drain inlets and catch basins within the project area will be identified with signs containing prohibitive language to discourage illegal dumping.

6.4 Natural BMPs

The project site has vegetation, consisting of mostly native grasses and shrubs. The slopes surrounding the single-family residence will be vegetated with native or drought tolerant vegetation. Yards will, in most cases, be planted with native and introduced grasses.

6.5 Construction BMPs

As outlined in the hydrology report, several BMP's will be utilized during the construction phase. All BMP's shall be installed or placed in accordance with the current design standards to prevent any pollutants from exiting the proposed development. At a minimum the following Caltrans BMP's shall be used:

- CD7(2): Dewatering
- CD8(2): Paving Operations
- CD9(2): Structure Construction and Painting
- CD10(2): Material Delivery and Storage
- CD12(2): Spill Prevention and Control
- CD13(2): Solid Waste Management
- CD16(2): Concrete Waste Management
- CD17(2): Sanitary/Septic Waste Management
- CD18(2): Vehicle and Equipment Cleaning
- CD19(2): Vehicle and Equipment Fueling
- CD20(2): Vehicle and Equipment Maintenance
- CD24B(2): Temporary Seeding and Planting
- CD26A(2): Soil Stabilization
- CD26B(2): Geotextiles, Mats/Plastic Covers and Erosion Control Blankets
- CD29A(2): Stabilized Construction Entrance
- CD29B(2): Stabilized Construction Roadway
- CD31(2): Earth Dikes, Drainage Swales, and Lined Ditches
- CD33A(2): Outlet Protection/Velocity Dissipation Devices
- CD33B(2): Flared Culvert End Sections
- CD36(2): Silt Fences
- CD38(2): Sand Bag Barrier

For details for each of the above-listed BMP's, please see Caltrans *Storm Water Quality Handbook, Construction Contractor's Guide and Specifications*, April 1997.

7.0 STORMWATER MAINTENANCE PLAN

7.1 Maintenance of the Stormwater Management Program

The project proposes to incorporate the maintenance of the stormwater control measures into the Private Road Maintenance Agreement and the CC&R's of the project. The agreements will provide for the collection and disbursement of funds to provide upkeep and repair of any and all of the storm control measures.

The control measures that have been proposed require no filters, pumps or replaceable parts. The owners of the parcels will conduct visual inspections of the inlet and outlet, at a minimum of once a year, to remove any debris or trash from the inlet. Because most owners will wish to keep their property clean, it is more likely that the owners will check the drains and riprap areas as a part of the normal maintenance of their property.

Although it is expected that the homeowner will provide their own maintenance, annual inspections and maintenance could be acquired from several local firms at a rate of \$195/annually (one visit). The best time to inspect the site would be during periods of peak rainfall, to ensure drains and rip-rap are being properly maintained.

7.2 Drain Inlets

The operation and maintenance needs of the inlets are:

- Scheduled inspections for structural integrity.

Inspection Frequency

The facilities will be inspected and inspection visits will be completely documented:

- Once a month at a minimum.
- After every large storm (after every storm monitored or those storms with more than 0.50 inch of precipitation).
- On a weekly basis during extended periods of wet weather.

Aesthetic and Functional Maintenance

Aesthetic maintenance is important for public acceptance of stormwater facilities. Functional maintenance is important for performance and safety reasons.

Both forms of maintenance will be combined into an overall Stormwater Management System Maintenance.

The following activities will be included in the aesthetic maintenance programs:

- Graffiti removal – Graffiti will be removed in a timely manner to improve the appearance of the drain inlets to improve the appearance and to discourage additional graffiti or other acts of vandalism.

Functional maintenance has two components, preventative and corrective. The preventative maintenance activities to be instituted for the pipe inlets include:

- Trash and Debris Removal – Trash and debris accumulation will be monitored once a month during rainy and non-rainy seasons, as well as after every large storm event. Trash and debris will be removed from the units twice yearly, or when material is at 85% of capacity.
- Sediment Removal – Sediment accumulation will be monitored once a month during rainy and non-rainy seasons, as well as after every large storm event.
- Elimination of Mosquito Breeding Habitats- The most effective mosquito control program is one that eliminated potential breeding habitats.

Corrective maintenance is required on an emergency or non-routine basis to correct problems and to restore the intended operation. Corrective maintenance activities include:

- Removal of Debris and Sediment – Sediment, debris, and trash that may impede the water from flowing through the pipe will be removed and properly disposed. Temporary arrangements will be made for handling the sediments until a permanent arrangement is made.
- Structural Repairs – Once deemed necessary, repairs to the drainage pipe inlet and outlet structures will be done within 30 working days.
- Erosion Repair – Where factors have created erosive conditions (i.e. pedestrian traffic, concentrated flow, etc.) corrective steps will be taken to prevent loss of soil and any subsequent danger to the performance of the pipe. There are a number of corrective actions that can be taken, including erosion control blankets, rip-rap, or reduced flow through the area. Designers or contractors will be consulted to address erosion problems if the solution is not evident.
- Hazardous Waste – Suspected hazardous wastes will be analyzed to determine disposal options. Hazardous wastes generated on-site will be handled and disposed of according to applicable local, state, and federal regulations.

7.2.1 Determination of Appropriate Maintenance Mechanisms

The drain inlets are classified as “Second Category” BMPs, where there is a need to make sure private owners maintain the units and provide County ability to step in and perform BMP maintenance.

Mechanisms to assure maintenance for second category BMPs include:

- Stormwater Ordinance Requirement: The County of San Diego Watershed Protection, Stormwater Management, and Discharge Control Ordinance (S.O.) requires this ongoing maintenance. In the event that the mechanisms below prove ineffective, or in addition to enforcing those mechanisms, civil action, criminal action or administrative citation could also be pursued for violations of the ordinance.
- Public Nuisance Abatement: Under the S.O. failure to maintain a BMP would constitute a public nuisance, which may be abated under the Uniform Public Nuisance Abatement Procedure. This provides an enforcement mechanism additional to the above, and would allow costs of maintenance to be billed to the owner, a lien placed on the property, and the tax collection process to be used.
- Notice to Purchasers: Section 67.819(e) of the S.O. requires developers to provide clear written notification to persons acquiring land upon which a BMP is located, or others assuming a BMP maintenance obligation, of the maintenance duty.
- Conditions in Ongoing Land Use Permits: For those applications (listed in S.O. Section 67.804) upon whose approval ongoing conditions may be imposed, a condition will be added which requires the owner of the land upon which the stormwater facility is located to maintain that facility in accordance with the requirements specified in the SWMP. Failure to perform maintenance may then be addressed as a violation of the permit, under the ordinance governing that permit process.
- Subdivision Public Report: Tentative Map and Tentative Parcel Map approvals will be conditioned to require that, prior to approval of a Final or Parcel Map, the subdivider shall provide evidence to the Director of Public Works, that the subdivider has requested the California Department of Real Estate to include in the public report to be issued for the sales of lots within the subdivision, a notification regarding the maintenance requirement. (The requirement for this condition would not be applicable to subdivisions which are exempt from regulation under the Subdivided Lands Act, or for which no public report will be issued.)
- BMP Maintenance Agreement with Easement and Covenant:
 - An agreement will be entered into with the County, which will function three ways:
 - it will commit the land to being used only for purposes of the BMP;
 - it will include an agreement by the landowner, to maintain the facilities in accordance with the SWMP (this obligation would be passed on to future purchasers or successors of the landowner, as a covenant); and
 - it will include an easement giving the County the right to enter onto the land (and any necessary adjacent land needed for access) to maintain the BMPs.

This would be required of all applications listed in SO Section 67.804. In the case of subdivisions, this easement and covenant would be recorded on or prior to the Final or Parcel Map.

7.2.2 Funding

Developer will provide the County with SECURITY to back up the maintenance agreement, which would remain in place for an interim period of 5 years. The amount of the security would equal the estimated cost of 2 years of maintenance activities. The security can be a Cash Deposit, Letter of Credit or other form acceptable to the County. Agreement for security to contain provisions for release or refund, if not used.

7.3 Hydroseed the Cut Areas

The operation and maintenance needs of hydroseeded cut areas are:

- Vegetation management to maintain adequate hydraulic functioning and to limit habitat for disease-carrying animals.
- Animal and vector control.
- Scheduled inspections for vegetation stability and prosperity.
- Scheduled maintenance of hydroseeded areas; this is to include rehydroseeding any areas that are barren or where vegetation has deteriorated.

Inspection Frequency

- Once a month, or as needed.
- Grass height and mowing frequency may not have a large impact on pollutant removal. Consequently, mowing may only be necessary once or twice a year for safety or aesthetics or to suppress weeds and woody vegetation.

Aesthetic and Functional Maintenance

Aesthetic maintenance is important for public acceptance of stormwater facilities. Functional maintenance is important for performance and safety reasons.

Both forms of maintenance will be combined into an overall Stormwater Management System Maintenance.

The following activities will be included in the aesthetic maintenance programs:

- Graffiti removal – Graffiti will be removed in a timely manner to improve the appearance of the hydroseeded areas to improve the appearance and to discourage additional graffiti or other acts of vandalism.

Functional maintenance has two components, preventative and corrective. The preventative maintenance activities to be instituted for hydroseeded areas include:

- Trash and Debris Removal – Trash and debris accumulation will be monitored once a month during rainy and non-rainy seasons, as well as after every large storm event. Trash and debris will be removed from twice yearly, or as needed.
- Sediment Removal – Sediment accumulation will be monitored once a month during rainy and non-rainy seasons, as well as after every large storm event. Sediment will be removed from twice yearly, or as needed. All captured materials would be disposed of in a County authorized disposal facility or location.
- Elimination of Mosquito Breeding Habitats- The most effective mosquito control program is one that eliminates potential breeding habitats.

Corrective maintenance is required on an emergency or non-routine basis to correct problems and to restore the intended operation and safe function of the hydroseeded areas. Corrective maintenance activities include:

- Removal of Debris and Sediment – Sediment, debris, and trash that may impede the functioning of the hydroseeded areas will be removed and properly disposed. Temporary arrangements will be made for handling the sediments until a permanent arrangement is made.
- Rehydroseeding Barren Areas – Once deemed necessary, rehydroseeding of barren areas will be done within 30 working days.
- Erosion Repair – Where factors have created erosive conditions (i.e. pedestrian traffic, concentrated flow, etc.) corrective steps will be taken to prevent loss of soil and any subsequent danger to the performance or stability of the hydroseeded areas. There are a number of corrective actions that can be taken, including erosion control blankets, additional rip-rap, or reduced flow through the area. Designers or contractors will be consulted to address erosion problems if the solution is not evident.

7.3.1 Determination of Appropriate Maintenance Mechanisms

The hydroseeded areas area classified as “First Category” BMPs, where “the County should have only minimal concern for ongoing maintenance. The proposed BMPs inherently ‘take care of themselves’, or property owners can naturally be expected to do so as an incident of taking care of their property.”

Mechanisms to assure maintenance for fourth category BMPs include:

- Stormwater Ordinance Requirement: The County of San Diego Watershed Protection, Stormwater Management, and Discharge Control Ordinance (S.O.) requires this ongoing maintenance. In the event that the mechanisms below prove ineffective, or in addition to

- enforcing those mechanisms, civil action, criminal action or administrative citation could also be pursued for violations of the ordinance.
- Public Nuisance Abatement: Under the S.O. failure to maintain a BMP would constitute a public nuisance, which may be abated under the Uniform Public Nuisance Abatement Procedure. This provides an enforcement mechanism additional to the above, and would allow costs of maintenance to be billed to the owner, a lien placed on the property, and the tax collection process to be used.
 - Notice to Purchasers: Section 67.819(e) of the S.O. requires developers to provide clear written notification to persons acquiring land upon which a BMP is located, or others assuming a BMP maintenance obligation, of the maintenance duty.
 - Conditions in Ongoing Land Use Permits: For those applications (listed in S.O. Section 67.804) upon whose approval ongoing conditions may be imposed, a condition will be added which requires the owner of the land upon which the stormwater facility is located to maintain that facility in accordance with the requirements specified in the SWMP. Failure to perform maintenance may then be addressed as a violation of the permit, under the ordinance governing that permit process.
 - Subdivision Public Report: Tentative Map and Tentative Parcel Map approvals will be conditioned to require that, prior to approval of a Final or Parcel Map, the subdivider shall provide evidence to the Director of Public Works, that the subdivider has requested the California Department of Real Estate to include in the public report to be issued for the sales of lots within the subdivision, a notification regarding the maintenance requirement. (The requirement for this condition would not be applicable to subdivisions which are exempt from regulation under the Subdivided Lands Act, or for which no public report will be issued.)

7.3.2 Funding:

- No funding required.

7.4 Monitoring of BMP's and County Compliance Inspections

The project residents will be responsible for monitoring the stormwater control system. County inspectors will be allowed to inspect the stormwater system, without notice and on an as-needed basis.

7.5 Thresholds for Maintenance

The project residents should be instructed to inspect the stormwater control system after any rainfall that exceeds one-half-inch of rain in a 24-hour period. At a minimum, an inspection should occur at least once in a twelve-month period.

8.0 FISCAL RESOURCES

The financial responsibility for the proposed mitigation measures will be provided by the developer, during and immediately after the construction, but will ultimately be passed on to the individuals who purchase the lots. The maintenance of the BMP's will be included and financed through the private road agreement. In general, the agreement will provide for the disbursement of cost equally among the residences.

8.1 Summary of Maintenance Costs per Responsible Party

BMP	Responsible Party	Cost	Cost Basis
Drain Inlet	Homeowner's Association	Please Refer to Appendix D	Per Unit Per Inspection Twice Yearly
Hydroseeded Areas	Homeowner's Association	\$0.25/square foot to replace	As needed

For more information, please refer to Appendix D, Estimated Operation and Maintenance Costs for the Pilot BMP Project Table, County of San Diego

9.0 PROGRAM EVALUATION

Inspection by the owners of the individual lots, or public officials, would involve the visual inspection of the all inlets and riprap areas. They would be looking to ensure that all facilities are in a good state of operation, without damage to any of the BMP's in place. Inspection of the gravel drains should be done after large amounts of rainfall, to evaluate the functionality of the devices.

10.0 CONCLUSION

The proposed project can be built to be in compliance with the County's Guidelines for a Stormwater Management Plan. This analysis provides for post-construction stormwater protection and ensures that the proposed BMPs are effective with proper maintenance and long-term fiscal responsibility. The site design, source control, and structural treatment BMPs have been designed to control the stormwater flow and detain the water on the property to the maximum extent practicable.

The source controls, which are the educational material and the signage, will be used to deter and prevent the future residents from adding pollutants to the water. The site design BMPs, including an increase of green space around building sites and, where feasible, driveways to remain as gravel or to use porous pavers or permeable porous concrete will allow for maximum infiltration and will reduce the overall impermeability of the project. The structural treatment BMPs, including a drainage inlet at the top of the slope at the southwestern corner, will contain rainfall on-site, reduce flow rates, allow more surface area for detention of water on-site, and provide sediment and pollutant removal before the stormwater reaches the storm drain system.

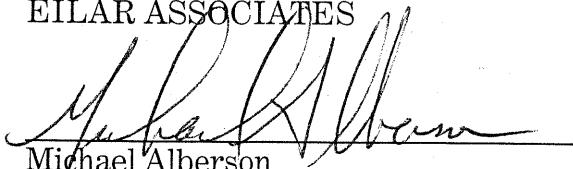
For these reasons, it is believed that these proposed BMPs will reduce potential pollutants to the maximum extent practicable, thus resulting in less than significant impact to receiving waters and impaired water bodies in the Carlsbad Watershed.

11.0 CERTIFICATION

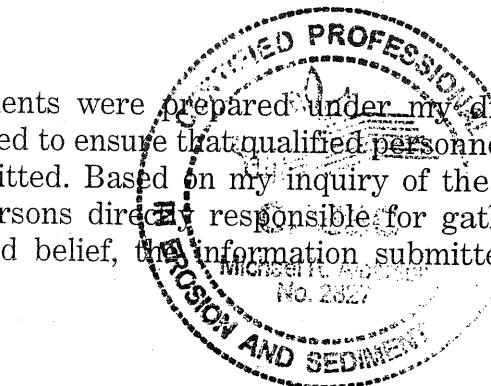
Report Preparation

I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete.

EILAR ASSOCIATES



Michael Alberson
Senior Environmental Analyst



3-3-05

Date

Permit Applicant

The Permit Applicant certifies that the BMP's proposed to support the permit application will be installed, monitored, maintained, or revised as appropriate, to ensure continued effectiveness.

Alvin Arafiles, Permit Applicant
12960 16th Street
Redlands, California 92373
Phone 909-799-9194

Date

12.0 REFERENCES

California Department of Transportation, *Storm Water Quality Handbooks, Construction Site, Best Management Practices (BMP's) Manual*, November 2000.

California Environmental Quality Act (CEQA), Public Resources Code Division 13, Sections 21000 *et. seq.*; Guidelines for the California Environmental Quality Act (CEQA), California Code of Regulations Title 14, Chapter 3, Sections 15000-215387.

Caltrans *Storm Water Quality Handbook, Construction Contractor's Guide and Specifications*, April 1997.

County of San Diego Department of Public Works Land Development Guidelines, Stormwater Maintenance Plan, February 20, 2002 (Draft).

County of San Diego Department of Public Works Land Development Guideline, Stormwater Management Plan, February 20, 2002.

County of San Diego Stormwater Standards Manual and the *County of San Diego Watershed Protection, Stormwater Management, and Discharge Control Ordinance*, Number 9424 (N.S.).

County of San Diego Stormwater Standards Manual, Appendix A, Section G.

County of San Diego, Ordinance No. 9426 and An Ordinance Amending the Code of Regulatory Ordinances Relating to the Addition of the Stormwater Standards Manual.

Model Standard Urban Storm Water Mitigation Plan for San Diego County, Port of San Diego, and Cities in San Diego County, City of San Diego Storm Water Program, November 19, 2001.

Porter-Cologne Water Quality Control Act of 1969.

San Diego Stormwater Copermittees; Jurisdictional Urban Runoff Management Program (URMP); Existing Residential Areas; Model Program Guidance; September 19, 2001.

Soil Survey, San Diego Area California, United States Department of Agriculture, December 1973.

Urban Storm Water Runoff: Pollution Problems and NPDES Storm Water Permits; California Regional Water Quality Control Board, San Diego Region, September 12, 1994.

Water Quality Control Plan for the San Diego Basin Region 9, September 8, 1994.

FIGURES

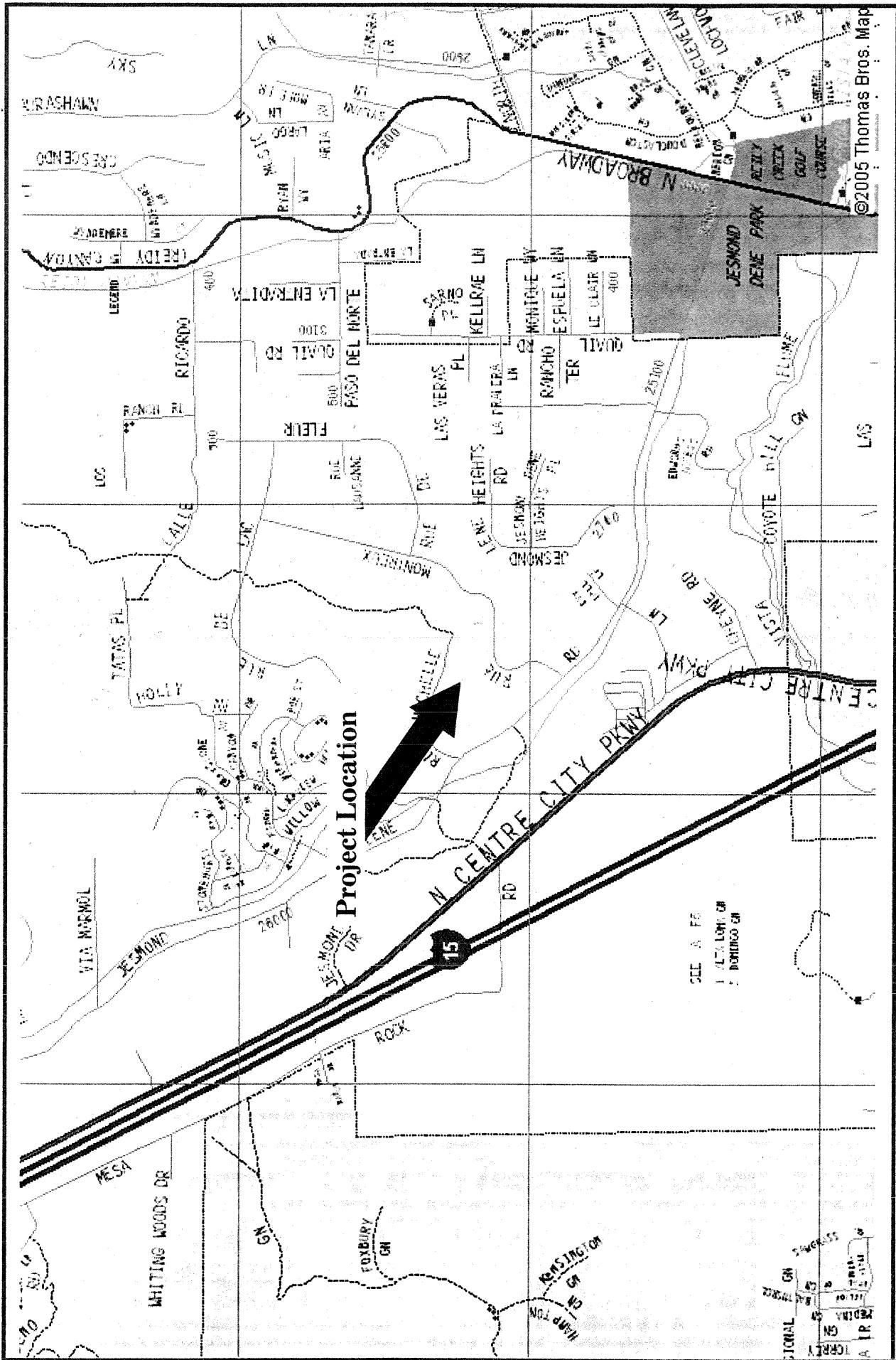


Figure 1

Regional Map Project #A41113W1

Eilar Associates
539 Encinitas Boulevard, Suite 200
Encinitas, California 92024
760-753-1865

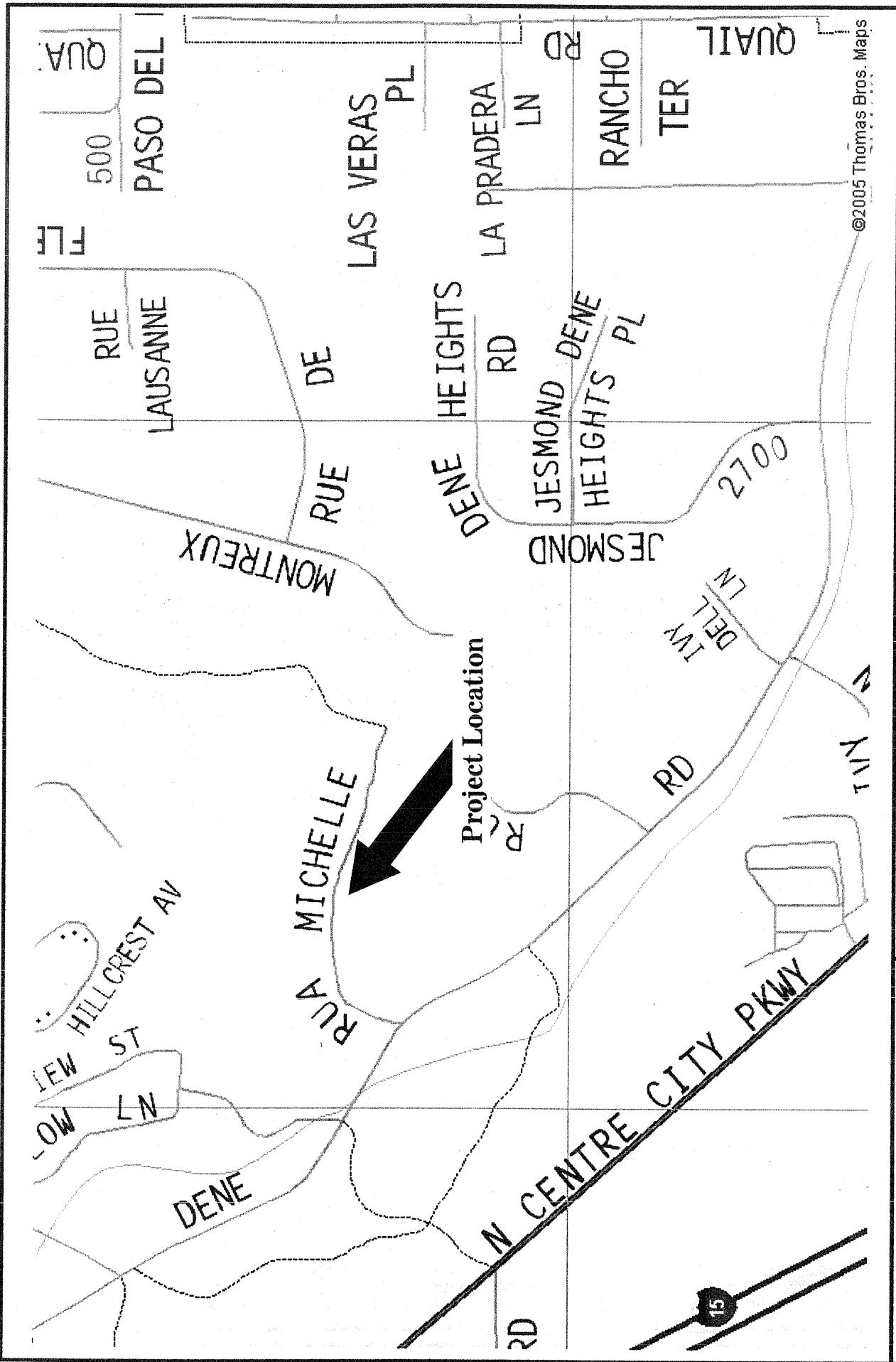


Figure 2

Street Map
Project #A41113W1

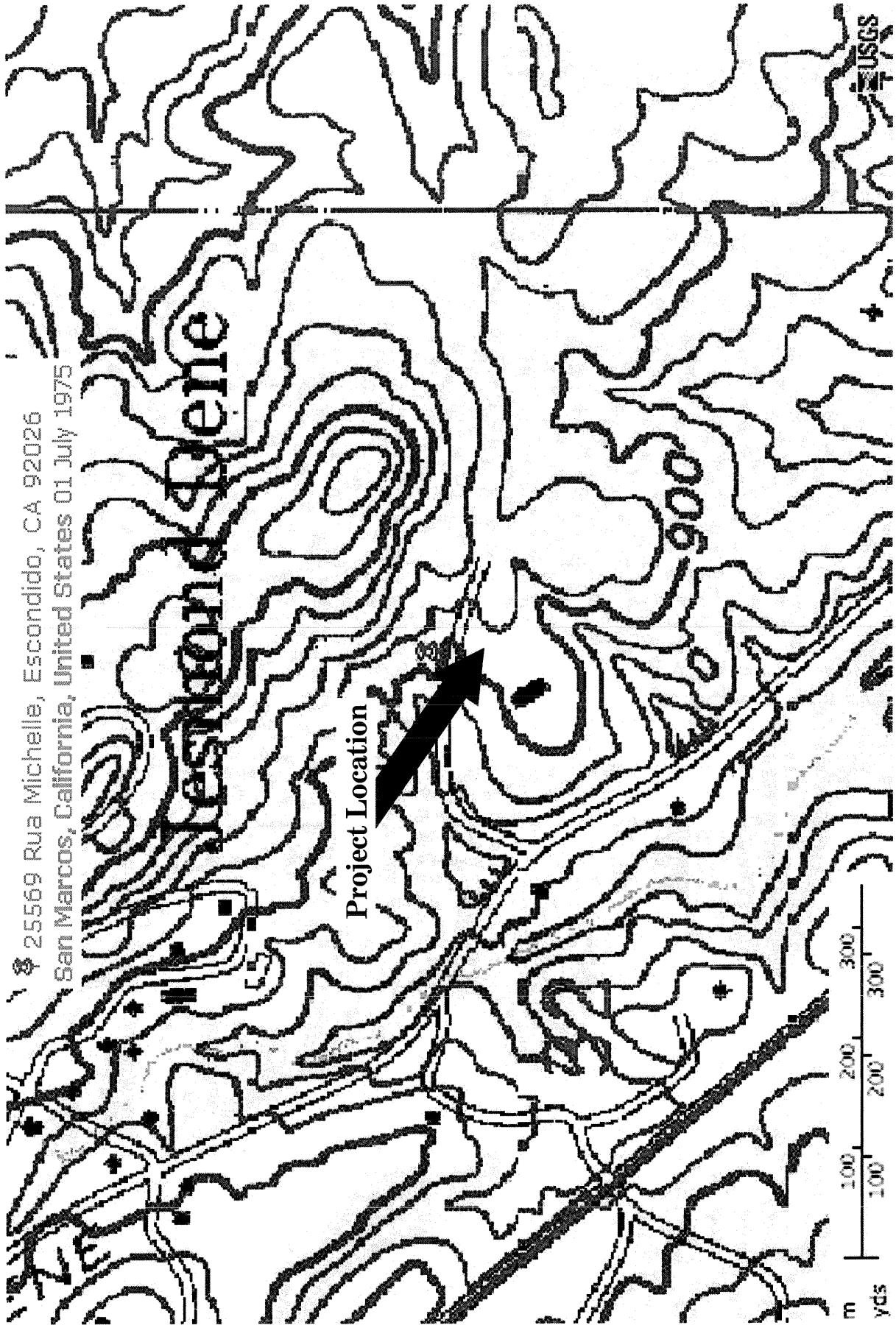
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539 Encinitas Boulevard, Suite 206
Encinitas, California 92024
760-753-1865



Eilar Associates
539 Encinitas Boulevard, Suite 206
Encinitas, California 92024
760-753-1865

Satellite Aerial Photograph
Project #A41113W1

Figure 3



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539 Encinitas Boulevard, Suite 206
Encinitas, California 92024
760-753-1865

Topographic Map
Project #A41113W1

Figure 4

SITE PHOTOGRAPHS



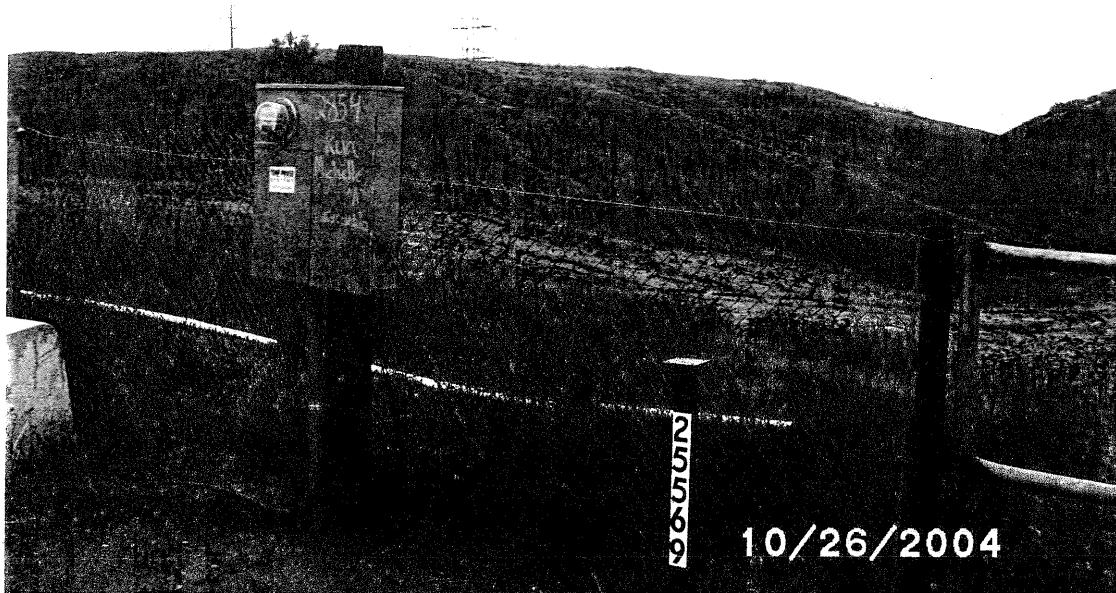
View Looking East/Southeast from Northern Central Property Boundary



View Looking South Across Property from Northern Central Property Boundary

FIGURE 5

SITE PHOTOGRAPHS

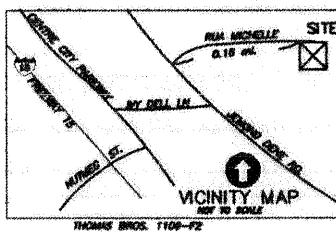
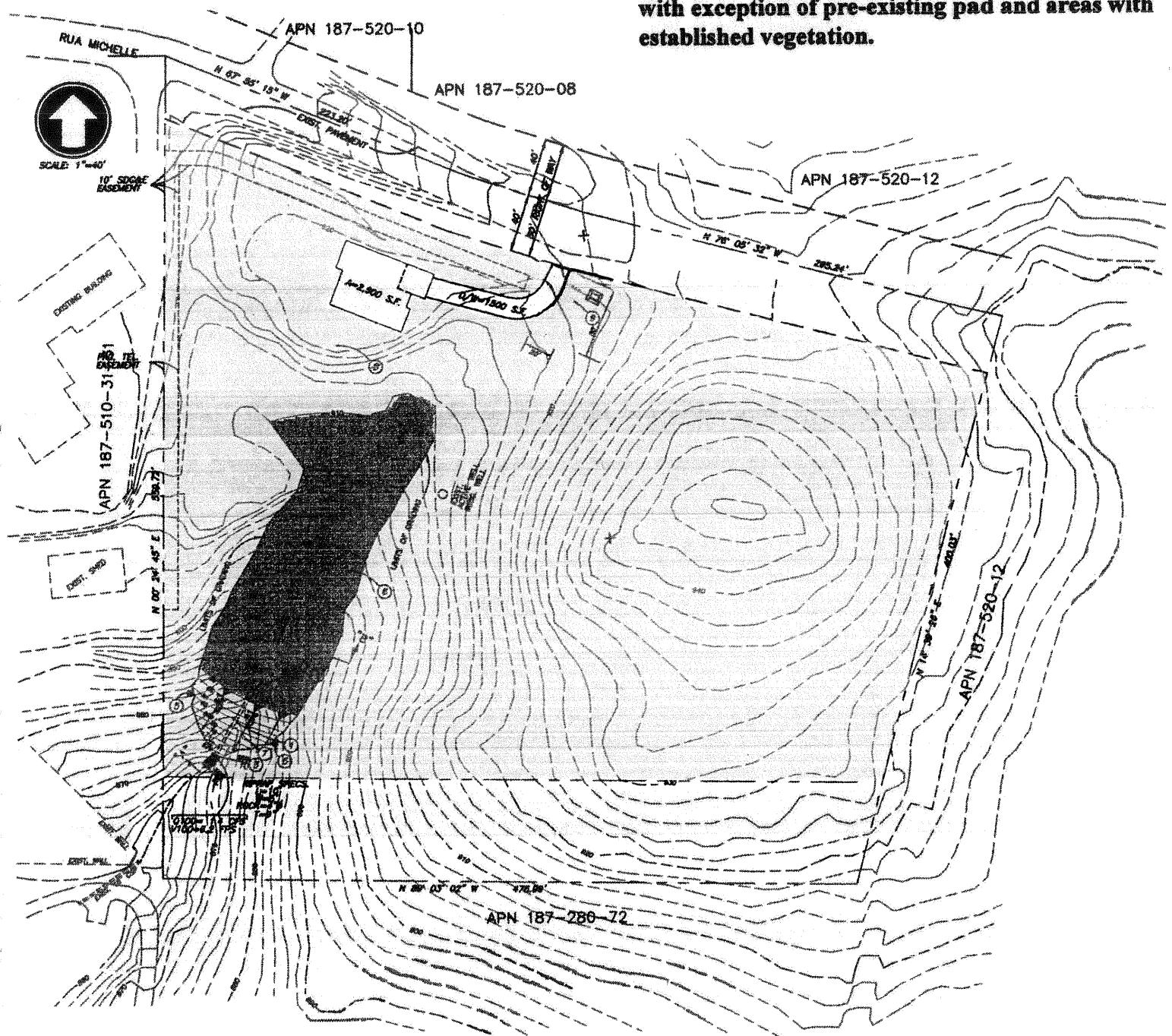


View Looking Southwest from Northern Central Property Boundary

FIGURE 6

Post Construction BMP Site Plan

**Permanently stabilize disturbed area slopes
using Hydroseeding and Bonded Fiber Matrix
with exception of pre-existing pad and areas with
established vegetation.**



LEGEND:	SYMBOL:
PROPOSED LINE	
PROPOSED CONTOUR	
EXISTING CONTOUR	
ROAD RIGHT OF WAY	
SILT FENCE/MAINT PROTECTION	
HOSE BIB	
UTILITY EASEMENT LINE	
RIPRAP	
2:1 SLOPE (FILL)	
HYDROMULCH SLOPE STABILIZATION	
SOIL BINDER STABILIZATION	
STABILIZED CONSTRUCTION ENTRANCE/EXIT	

STD. DWGS:

SC-10
1-8

SS-10

SS-3

33-5

TC-1

Figure 7

Major Watersheds in the San Diego Region

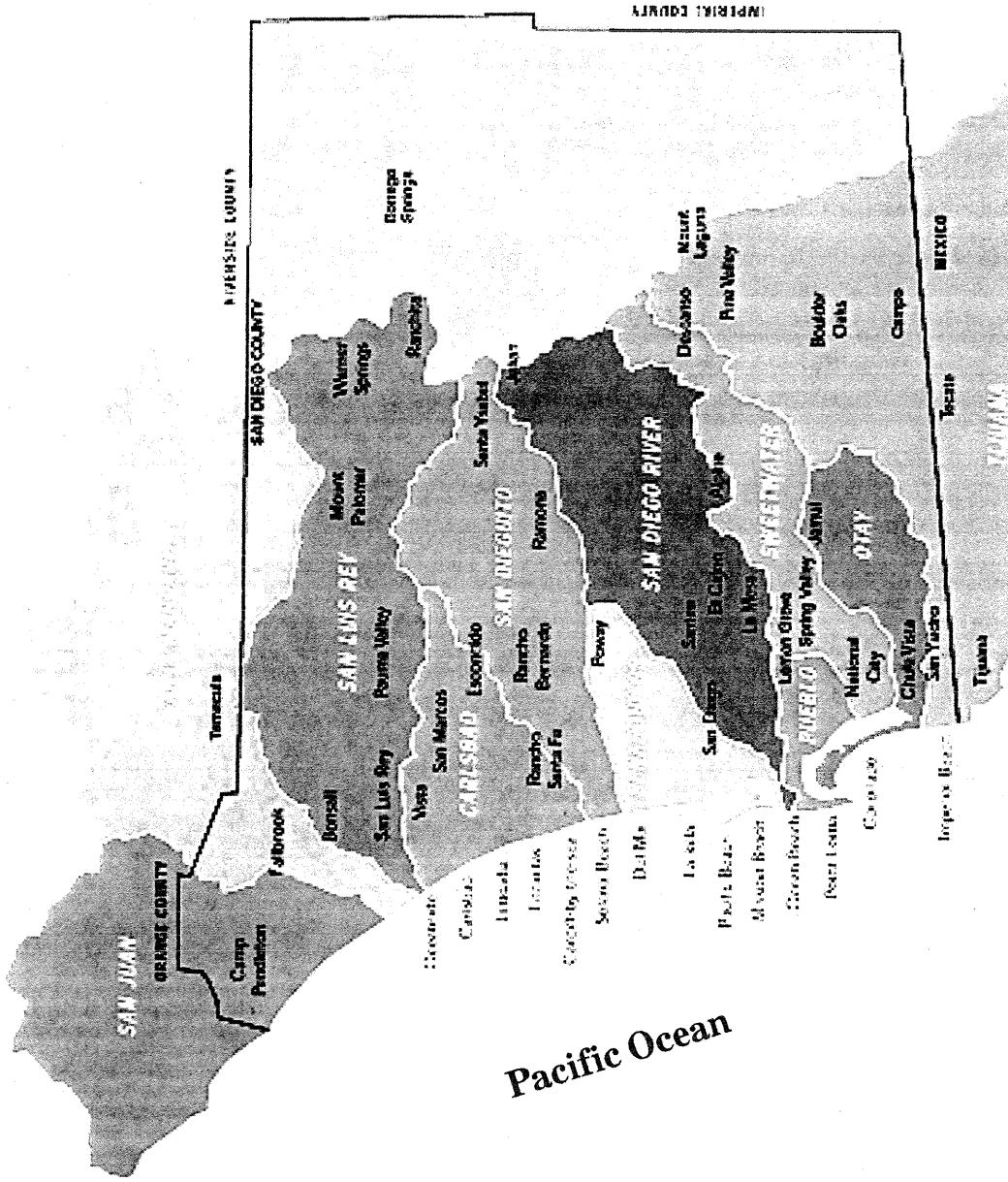
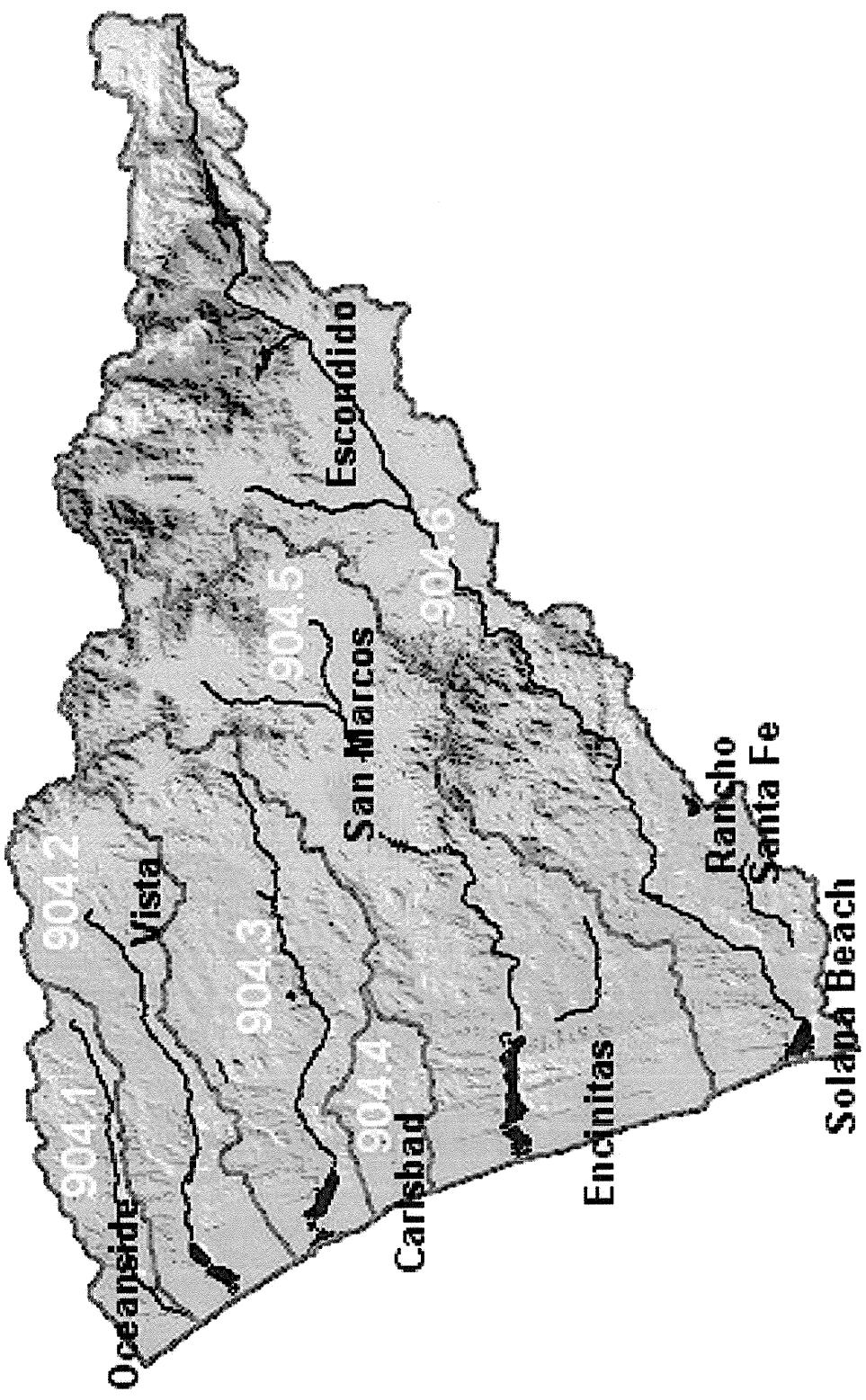


Figure 8

Region Water Quality Control Board,
San Diego Region (9), San Diego Hydrologic
Basin Planning Area (SD)
Major Watersheds in San Diego Region

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Encinitas, California 92024
760-753-1865

Carlsbad Watershed
Escondido Creek Hydrologic Subarea 904.62
Project #A41113W1

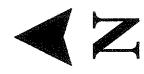
Figure 9

ICE.MAPS Legend:
Information Center for the Environment, UC Davis

- Counties
- CA State Water Resources Control Board
- Major California Rivers (from CARA Prof)
- California Rivers
- Assessment Basins (USGS)
- SWRCB Riverine Waterbodies
- 1988 California 303(d) List and TMDL P
- 303(d) List and TMDL P
- Water Quality Standards Watersheds
- Water Quality
- Standards Watersheds



Data provided by Teale Data Center, US EPA, and CA DFG



Eilar Associates
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Encinitas, California 92024
760-753-1865

Figure 10

APPENDIX A

**DRAINAGE STUDY/HYDRAULIC CALCULATIONS FOR GRADING
PERMIT L14349
FOR THE ARAFILES PROJECT**

Drainage Area A

Area = 2.92 acres

ΔH = 64.5 feet

Length = 618, L= 518 and $L_M=100$ and $T_i=6.4$ (table 3.2)

$$T_t = \left(\frac{11.9L^3}{\Delta H} \right)^{0.385}$$

$$T_t = \left(\frac{11.9(518/5280)^3}{64.5} \right)^{0.385} * 60 \text{ min}$$

$$T_t = 2.14 \text{ min}$$

$$T_c = T_t + T_i$$

$$T_c = 8.54 \text{ min}$$

$T_c = D$ (duration in minutes)

$$I = 7.44(P_6)(D)^{-0.645}$$

$P_6 = 3.5$ in. (from the Hydrology Manual)

$$I = 7.44(3.5)(8.54)^{-0.645}$$

$$I = 6.53 \text{ in/hr}$$

$$Q_{100} = CIA$$

C = 0.32 (from table 3-1)*

$$Q_{100} = (0.32)(6.53)(2.92)$$

$$Q_{100} = 6.10 \text{ cfs}$$

Drainage Area B (sheet flow)

Land Area = 1.41 acres

ΔH = 43 feet

L = 386 feet (flow length)

n = 0.06 (Manning roughness coefficient (table 3-1))**

P₆ = 3.5 in. (100-year, 6-hr rainfall)

s = 0.11 (slope of hydraulic grade line)

$$T_t = \frac{0.007(nL)^{0.8}}{(P_6)^{0.5} s^{0.4}} \quad (\text{eq. 3-3, USDA TR-55})$$

$$T_t = \frac{(0.007(0.06*386))^{0.8}}{(3.5)^{0.5}(0.11)^{0.4}}$$

$$T_t = 6.67 \text{ min}$$

T_c = T_t (only sheet flow occurs)

$$T_c = 6.67 \text{ min}$$

T_c = D (duration in minutes)

$$I = 7.44(P_6)(D)^{-0.645}$$

$$I = 7.44(3.5)(6.67)^{-0.645}$$

$$I = 7.66 \text{ in/hr}$$

$$Q_{100} = CIA$$

C = 0.36 (from table 3-1)

$$Q_{100} = (0.36)(7.66)(1.41)$$

$$Q_{100} = 3.89 \text{ cfs}$$

Drainage Area C

Land Area = 0.79 acres

ΔH = 22 feet

L = 186 feet (flow length)

n = 0.06 (Manning roughness coefficient (table 3-1))**

P₆ = 3.5 in. (100-year, 6-hr rainfall)

s = 0.12 (slope of hydraulic grade line)

$$T_t = \frac{0.007(nL)^{0.8}}{(P_6)^{0.5} s^{0.4}} \quad (\text{eq. 3-3, USDA TR-55})$$

$$T_t = \frac{(0.007(0.06*186))^{0.8}}{(3.5)^{0.5}(0.12)^{0.4}}$$

$$T_t = 3.63 \text{ min}$$

T_c = T_t (only sheet flow occurs)

T_c = 3.63 min

T_c = D (duration in minutes)

$$I = 7.44(P_6)(D)^{-0.645}$$

$$I = 7.44(3.5)(3.63)^{-0.645}$$

$$I = 11.3 \text{ in/hr}$$

Q₁₀₀ = CIA

C = 0.36 (from table 3-1)

$$Q_{100} = (0.36)(11.3)(0.79)$$

$$Q_{100} = 3.22 \text{ cfs}$$

* Soil type is shown as primarily type B for drainage area A. Drainage areas B and C for the project have a majority soil type C (San Diego Area Soil Survey).

** Surface roughness is most nearly that of cultivated soils with residual cover $\leq 20\%$. Although never used for commercial growing, the soil was turned, and sparse cover is present.

Post – Development

The existing project area has been graded, is not designated as permanent natural space, and is located in a low density residential area. The project site currently has an approximately 900 foot² concrete building pad. The proposed project is the construction of a 2,500 foot² residence and a 1,500 foot² driveway. The project will generate a higher Q₁₀₀ value due to the increase of impervious area.

There will be a 1.6% net decrease in site permeability, under these conditions. It is anticipated that the runoff coefficient (C) will not change significantly. Using worst-case soil characteristics (type C) and the drainage area with the highest pre-development Q (drainage A), the C value is as follows:

$$C = 0.90(\% \text{ impervious}) + (C_p(1 - \% \text{ impervious}))$$

C_p = Pervious Coefficient Runoff Value, Table 3-1, LDR (soil type C) = 0.36

$$C = 0.90(0.016) + (0.36(1 - 0.016))$$

$$C \approx 0.37$$

Post Development Q with mitigations (BMP)

$$Q_A = CIA$$

$$C = .37$$

$$Q_A = (.37)(6.53)(2.92)$$

$$Q_A = 7.06 \text{ cfs}$$

$$Q_{100} = Q_A + Q_B + Q_C$$

$$Q_{100} = 7.06 + 3.89 + 3.22 = 14.17$$

General Recommendations and Discussions:

- A) The project consists of 5.2 acres of low density residential land which has been graded over 12-20 percent of the site.
- B) This project does not propose to alter the existing drainage pattern of the area but does propose the grading and development within an existing drainage course. Mitigation measures are proposed to reduce post-development run-off flows to less than pre-developed flows. They include the following:
 1. Green Space has been increased around the building sites.
 2. Where feasible walkways, drive ways and low traffic hard surfaces are proposed for porous concrete.

Drainage Area	Pre-Development "Q"	Proposed Post-Developed "Q"
Area A	6.10 CFS	7.06 CFS
Area B	3.89 CFS	3.89 CFS
Area C	3.22 CFS	3.22 CFS

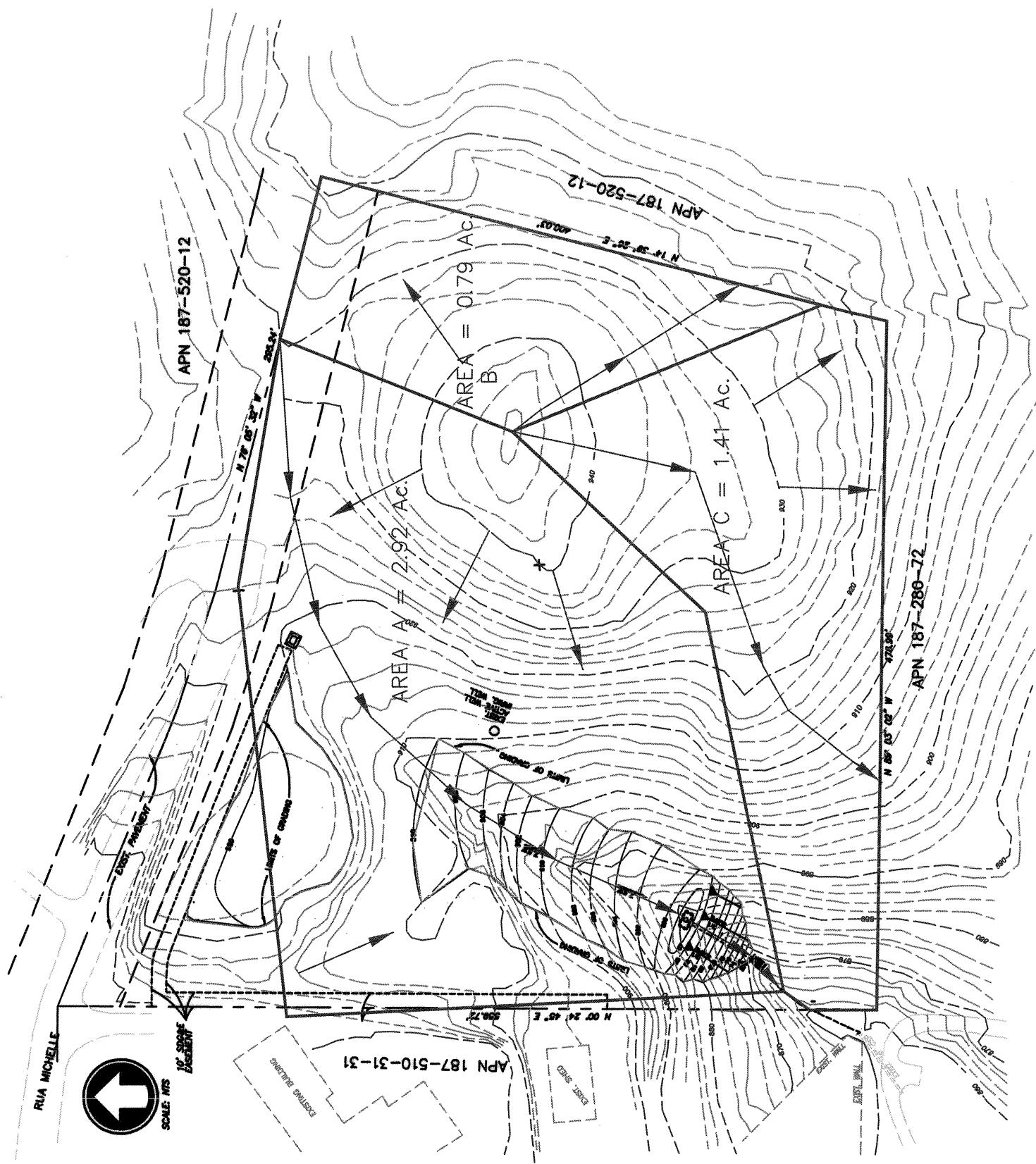
- C) All BMPs shall be constructed, installed or placed in accordance with the current design standards to prevent any pollutants from exiting the proposed development.

At a minimum the following CASQA BMP details shall be used:

Silt fence, sandbag barriers, storm drainage inlet protection, stabilized construction entrance/exit, material delivery and storage, solid waste management, hazardous waste management, concrete waste management, sanitary/septic waste management, hydro seeding.

All BMPs shall be subject to approval by the County of San Diego and plan to monitor the effectiveness of these BMPs after construction is recommended.

Turcoglyphic Map with Dimension A = 0.5

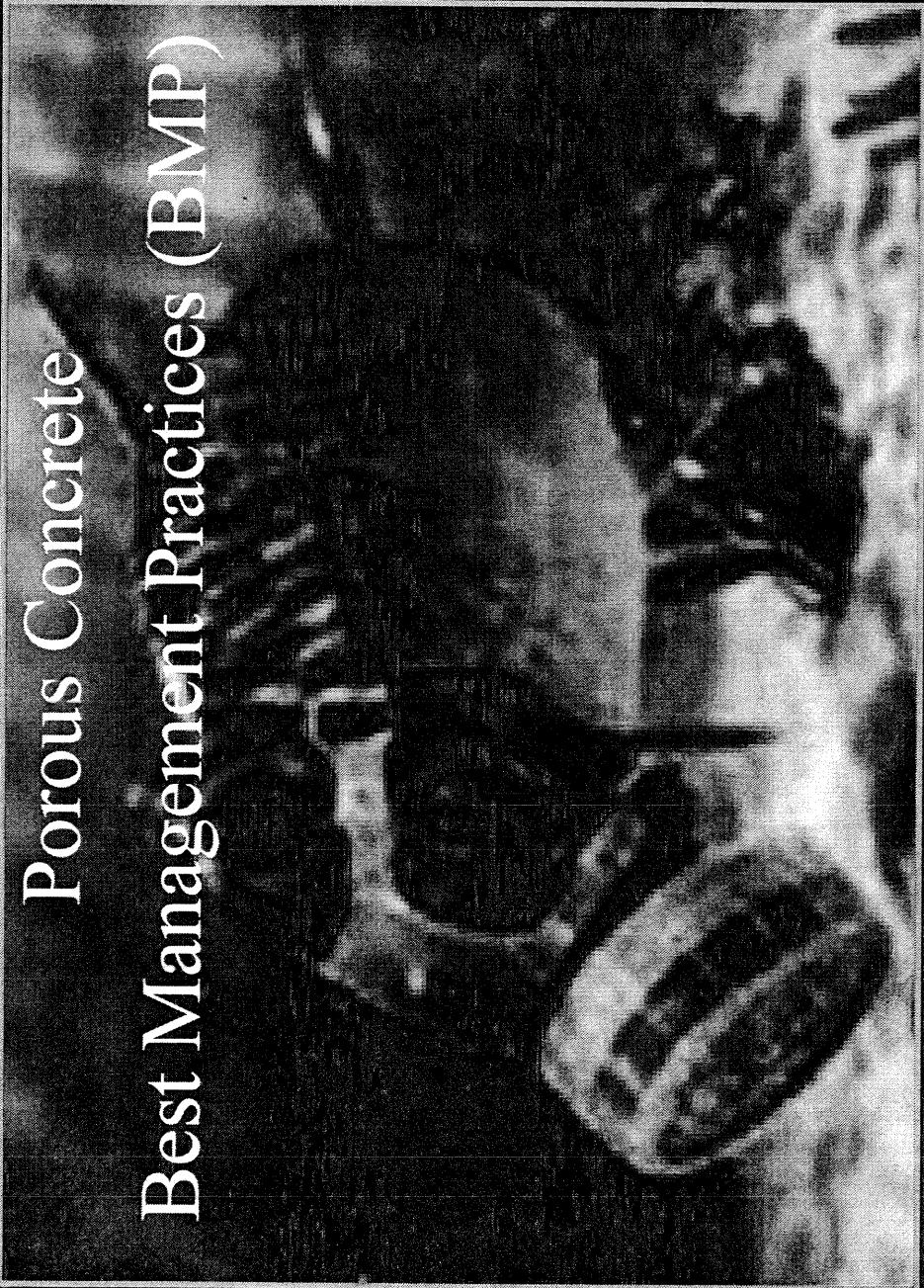


APPENDIX B

**T.B. PENICK & SONS STF PAVING SYSTEM, POROUS CONCRETE AND
PAVING SYSTEM GUIDELINES**

T.B. Penick & Sons STF Paving System

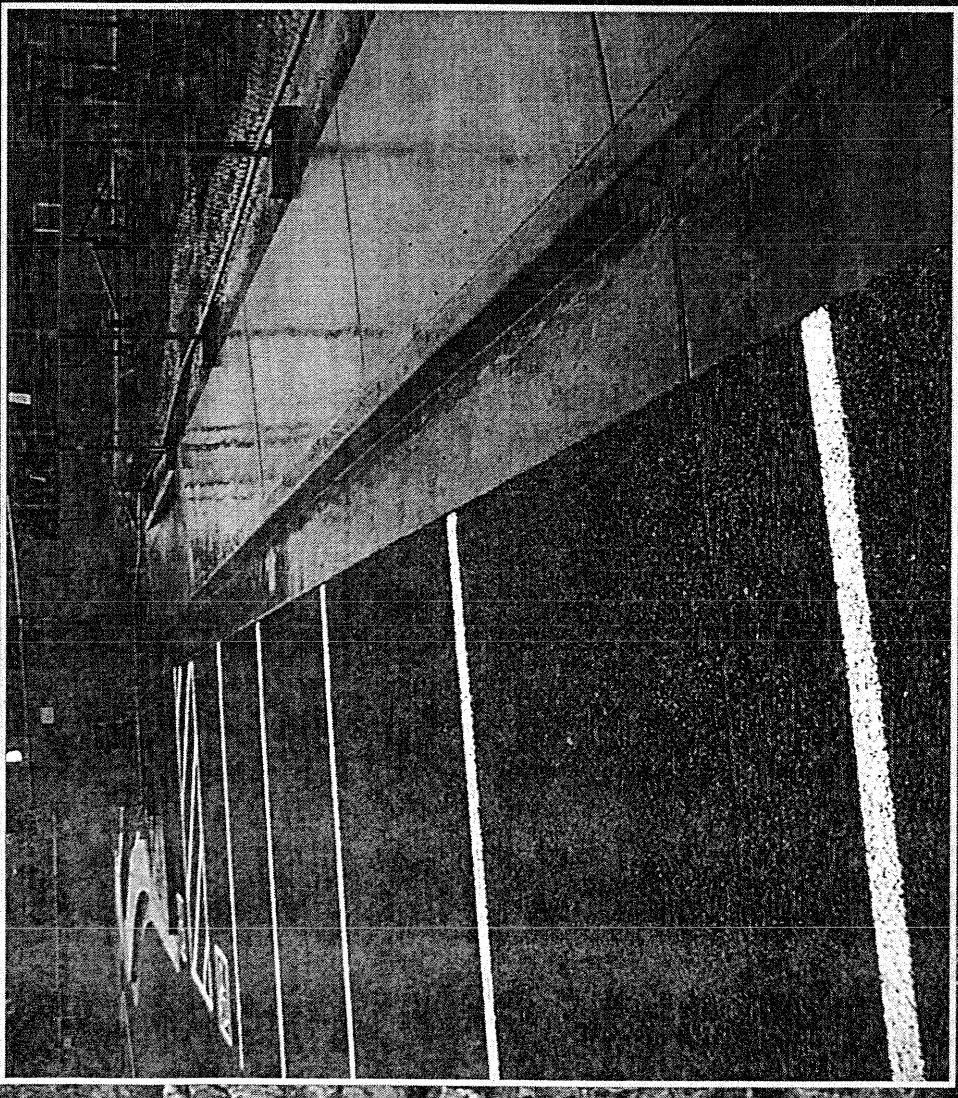
Porous Concrete
Best Management Practices (BMP)



Save The Fish

Porous Concrete IS:

- A proven alternative to asphalt and conventional concrete
- A unique, cost effective product which saves site owner, as storm water can be addressed much earlier in the development process
- Zero runoff
- This provides the ultimate environmental AND low cost solution



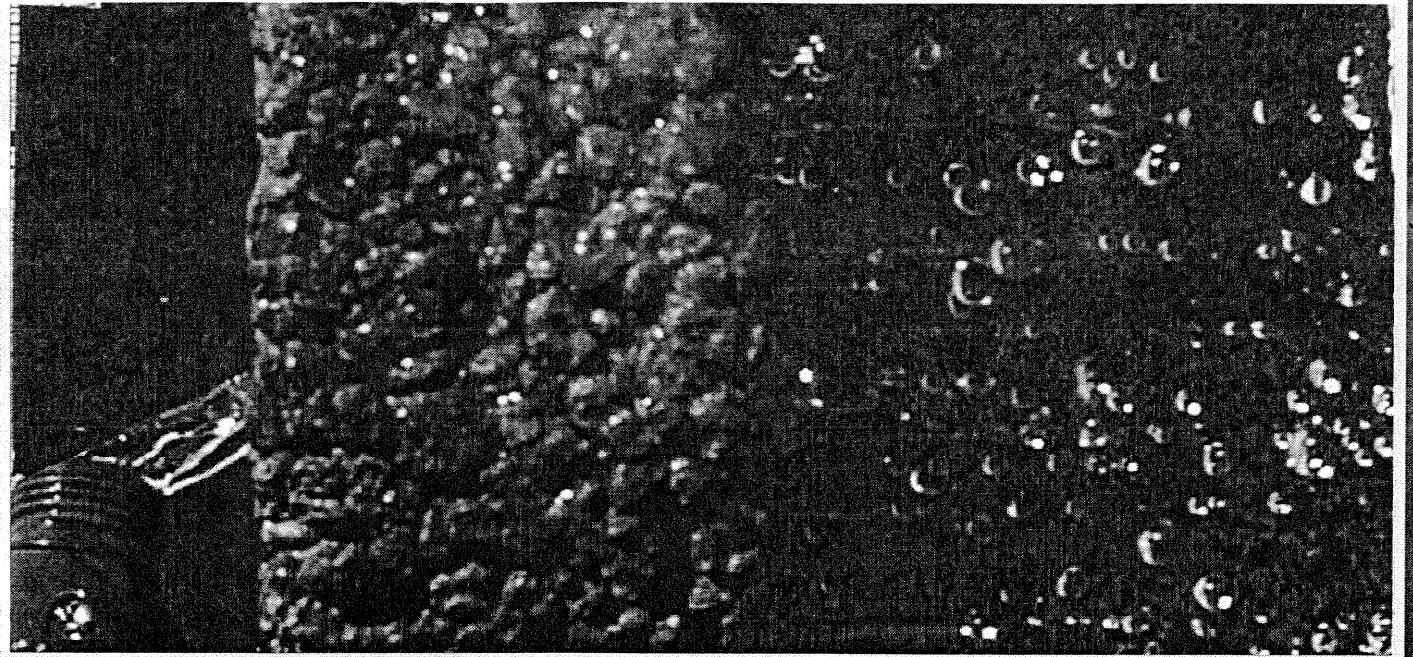
(Raining during this photo)

A Discontinuous Mix

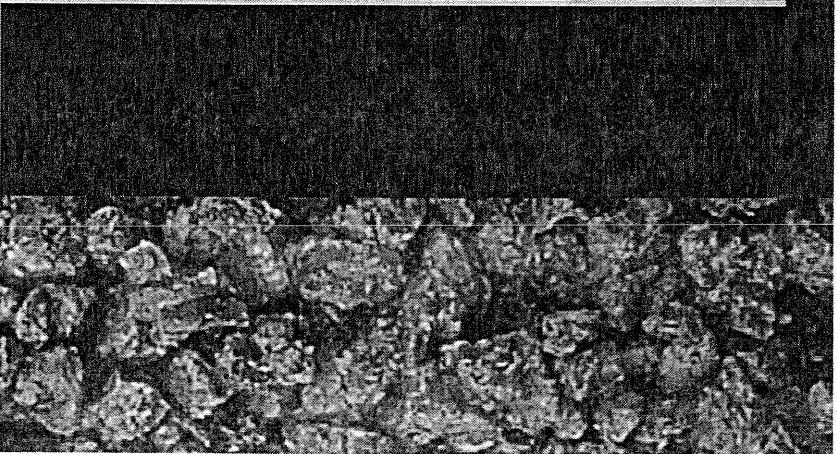
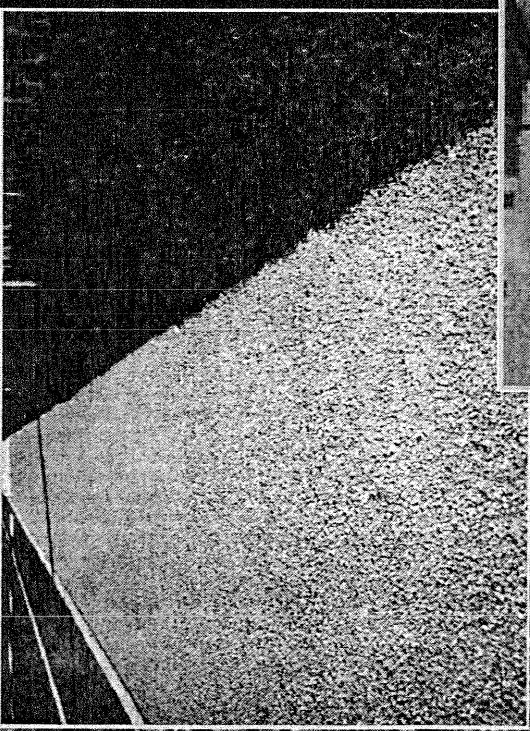
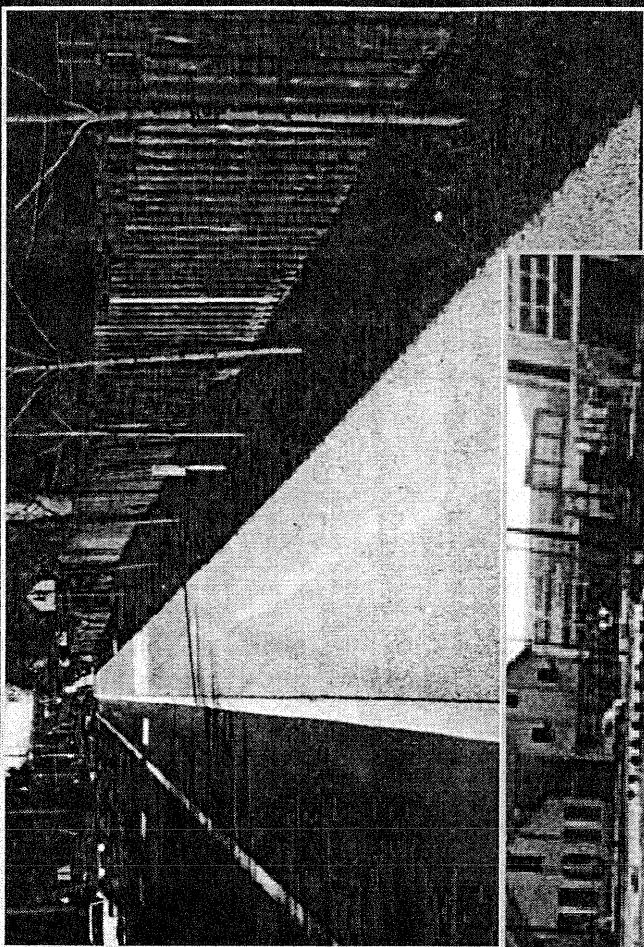
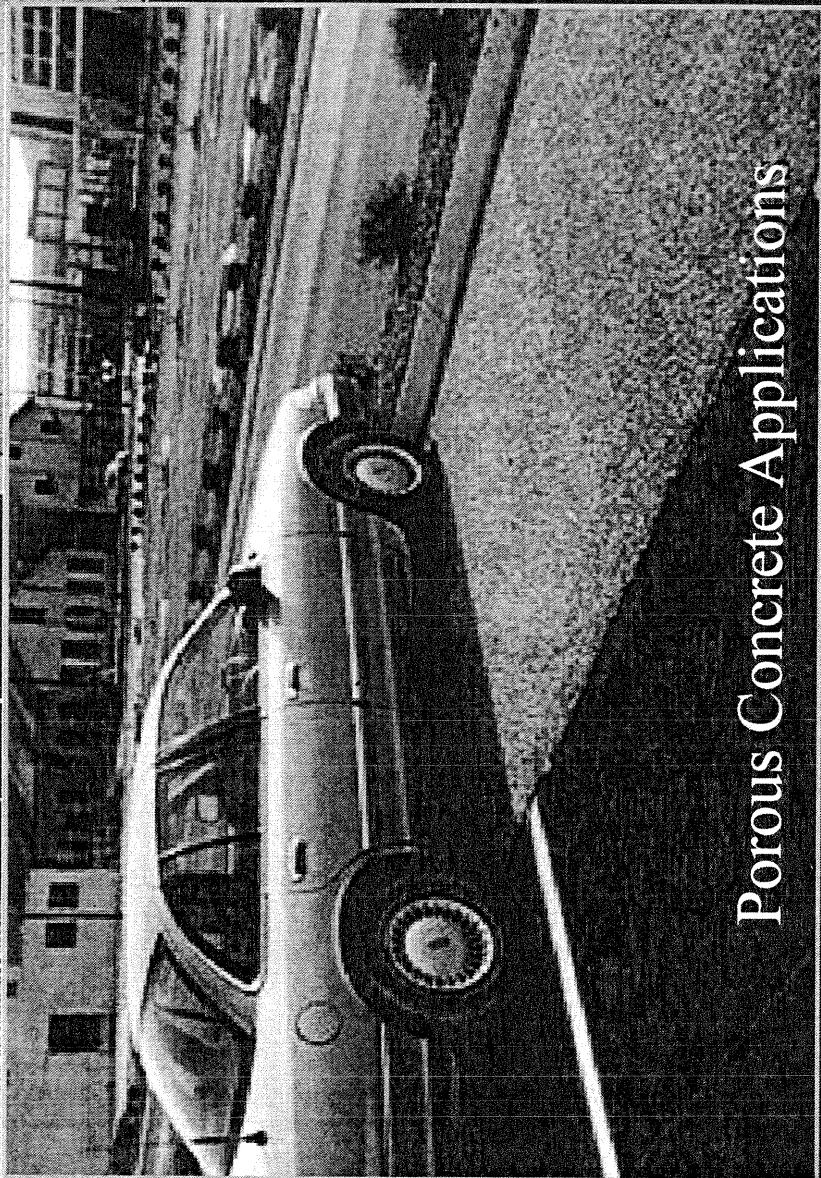
■ 15-25% Voids
3 to 5 gallons per minute per sq. ft.
= 270 to 450 inches per Hour!

Regulatory Compliance

■ Porous concrete paving has been accepted by the EPA as an alternative to other storm water pollution prevention BMPs (grassy swales, drain invert filtration systems).

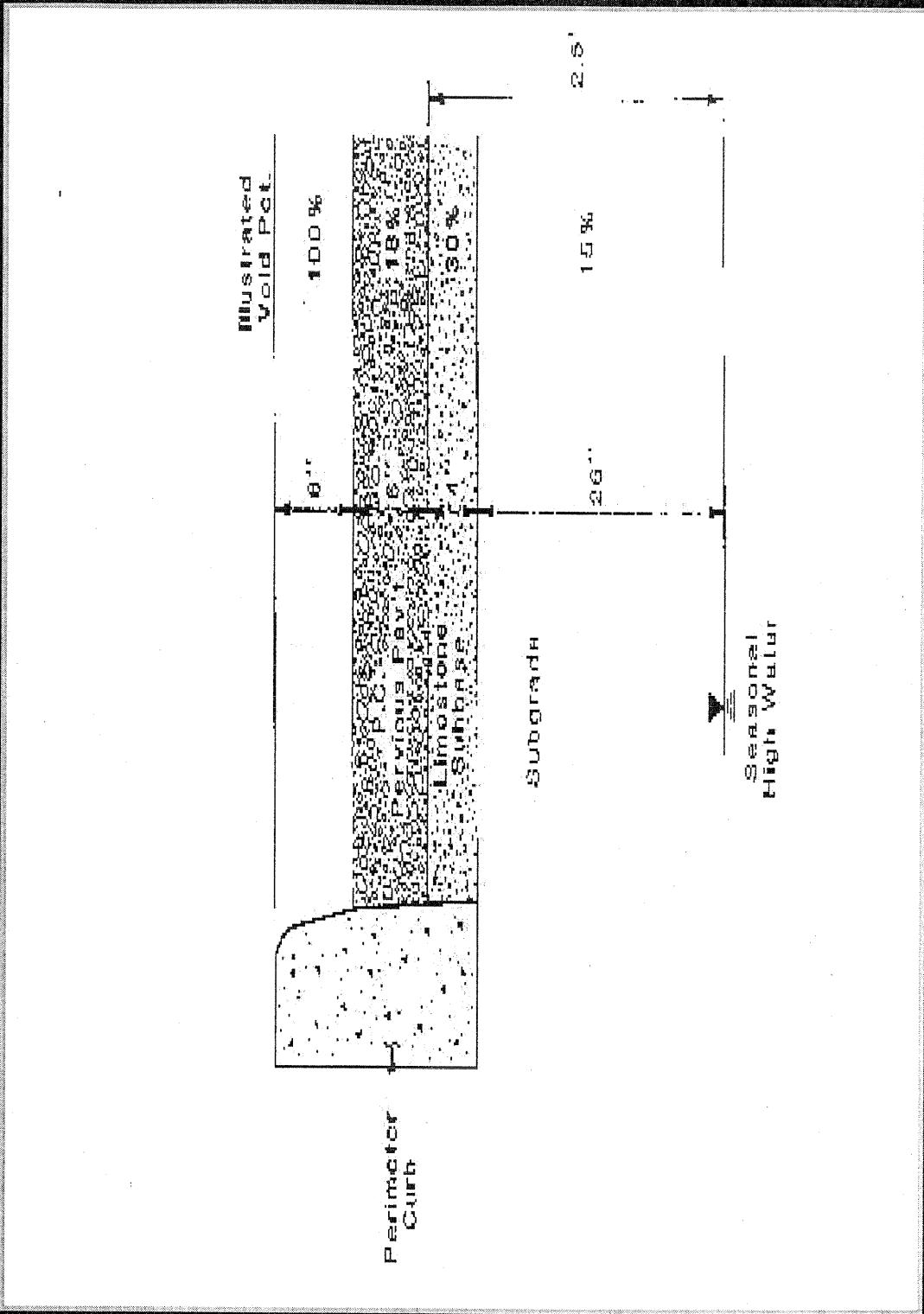


Porous Concrete Applications



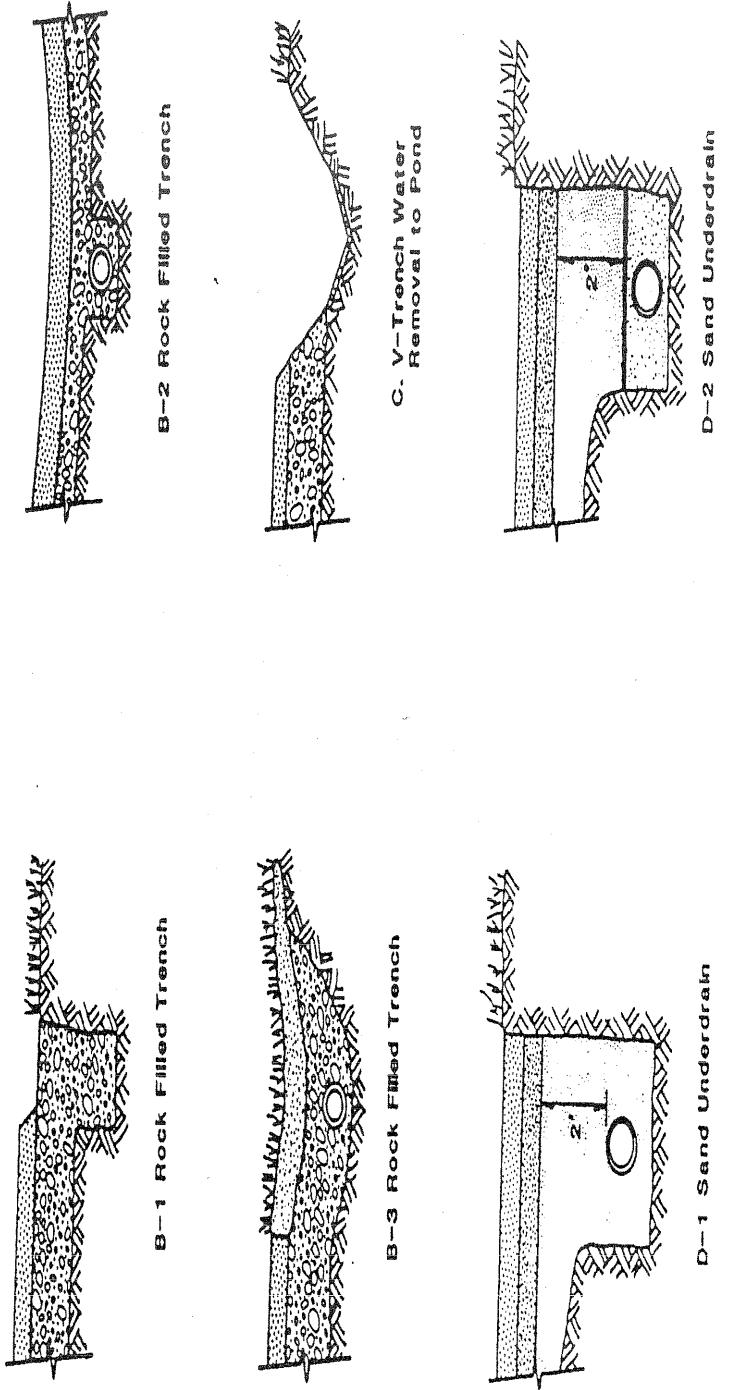
Design Example

Storm Water Storage System



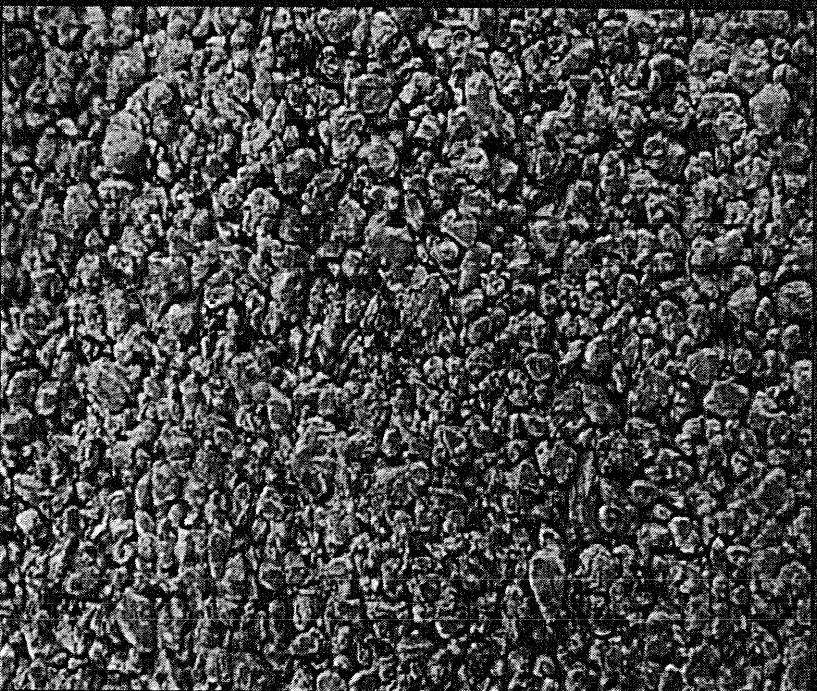
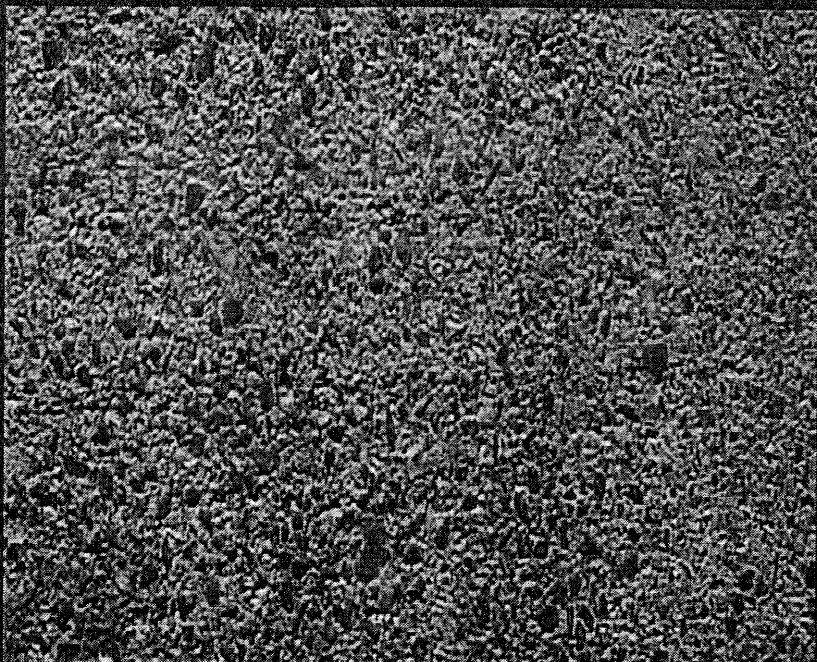
Design Example

Supplemental Drainage



Source: Investigation of Porous Pavements for Urban Runoff Control. Thelen et al.
(After Virginia State Water Control Board, 1979. "Urban Best Management
Practices Handbook")

Applied porous concrete before and after grinding



APPENDIX C

HOMEOWNER'S MANUAL– NEW TENANT EDUCATIONAL MATERIALS

Think Blue Top Tips

Healthy Yards and Healthy Families



Before beginning an outdoor project, locate the nearest storm drain and take action to protect it from debris. This may require you to sweep the gutter between your project and the storm drain, before starting work. Chemicals, fertilizers, herbicides and pesticides can be harmful to you, your family, plant and animal life.

- Use them sparingly. Read labels carefully and don't apply if the forecast calls for rain.
- Use mulch instead of herbicides to prevent weeds from growing and to help absorb water.
- Select drought resistant native plants that conserve water and prevent runoff.
- Don't overwater your lawn. Water during the cooler times of day and don't let it run off into the gutter.
- Drain swimming pools only when chlorine levels are not detected by your swimming pool test kit.
- Keep your gutters in front of your house clean of leaves and grass cuttings. Sweep up debris instead of hosing down your driveway.

Drain swimming pools only when chlorine levels are not detected by your swimming pool test kit. Keep your gutters in front of your house clean of leaves and grass cuttings. Sweep up debris instead of hosing down your driveway.

Helpful Habits Around the House

- If you use hazardous substances such as paints, solvents and cleaners, use them sparingly, according to directions. Store properly to avoid spilling. If you use water-based paints, rinse paint brushes in the sink. For oil-based paints, filter and reuse paint thinner. Dispose of all used paints and materials through a hazardous waste collection program. Never clean brushes or pour paint in the gutter or storm drain.
- If you use other hazardous substances such as cleaners and solvents, properly dispose through a hazardous waste collection program.
- Pick up trash and litter around your yard and home.
- If you're working on a home improvement project, dispose of drywall, concrete and mortar in the trash. Don't rinse concrete or mortar into the street. Sweep up all project debris.
- Pick up pet waste and dispose in the toilet or in a bag for the trash. Bacteria from pet waste contains harmful bacteria that pollutes our waterways. Remember "Scoop the Poop!"

Vehicles and Garage Safety

- Routinely check your car for leaks and keep it tuned up. Car pooling or using a bicycle for transportation helps reduce pollutants on our streets.
- Never pour any chemicals or other hazardous substances from cars down a storm drain, on to the ground or leave on driveways or parking lots.
- When changing fluids from your car, drain into a clean container and seal completely. Take the oil and the oil filter to a used oil collection site.
- If you spill fluids, contain quickly with rags or kitty litter. Safely dispose at a hazardous waste collection site.
- If you wash your own car, use a shutoff nozzle on your hose and use detergents and water sparingly. Wash your car on a landscaped surface.



You're the Solution to storm drain pollution
Protecting our beaches, bays, and wetlands

Easy Solutions for Keeping Our Creeks, Bays and Ocean Clean

Important Resources

City of San Diego Household Hazardous Materials Program Information: (619) 235-2111

- Dates and locations of household hazardous waste collections
- Locations for recycling motor oil
- Information on safe use and storage and substitutes for commonly used household products

Poison Control Center: (800) 876-4766
(call 911 in an emergency)



www.Thinkbluesd.org

The CITY OF SAN DIEGO thanks the following partners for their generous support of the Think Blue program:

San Diego Port District



www.portofsandiego.org

This information will be made available in alternative formats upon request.

IP 171 (ww)

Printed on recycled paper

When it rains or when water flows out of yards, it flows directly into storm drains. You've probably seen storm drains on our San Diego streets. Many people think that everything that flows into a storm drain gets treated, just like wastewater in a sewer system, but actually these two systems are *not* connected. Everything that flows down into a storm drain goes *untreated* directly into our creeks, bays, lagoons and ultimately the ocean. Storm water can consist of pesticides, fertilizers, pet waste, litter, oil and other automobile fluids, soil erosion and household chemicals. Some of these pollutants flow into storm drains unintentionally, but many items are carelessly thrown directly into storm drains. The Clean Water Act prohibits disposal of wastes and pollutants into creeks, bays, lakes and oceans.

These pollutants have harmful effects on recreational areas, waterways and wildlife. Some of San Diego's most popular beaches have been closed because of storm water pollutants. Ultimately, storm water pollution harms all of us because we depend on our waterways for recreation and to support San Diego's tourist industry. By preventing pollution from occurring in our homes, neighborhoods and businesses, we can protect our environment and our families' health and safety.

You and your family play an important role in storm water pollution prevention. This brochure provides you with easy and inexpensive tips to prevent pollutants from entering storm drains in the first place. If everyone makes a few simple changes, we can help protect our San Diego lifestyle and environment. "Think Blue" means preventing pollution before it reaches our waterways.



Caltrans

Port of San Diego

www.portofsandiego.org



www.Thinkbluesd.org

For more storm water pollution prevention information or a referral to your local hazardous waste collection program call:

1-888-THINK BLUE or 1-888-844-6525
In the City of San Diego call: 619-533-3793



ENVIRONMENTAL HEALTH

COUNTY OF SAN DIEGO WEB SITE

RESIDENTIAL BEST MANAGEMENT PRACTICES

STORMWATER PROGRAM

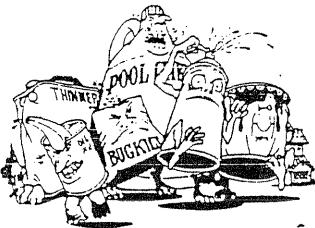
Is Stormwater from my home polluted?

Several activities that you do at your home have the potential to pollute runoff. Potential pollutants from homes include oil, grease and other petroleum hydrocarbons, heavy metals, litter and debris, animal wastes, solvents, paint and masonry wastes, detergents and other cleaning solutions, and pesticides and fertilizers.

How you manage your home impacts the ocean, even if you live several miles from the beach. Everything that exits your property will eventually run into the ocean. The sources of residential pollutants include household toxics, litter and debris, and runoff from car washing, pool and spa care, lawn maintenance and on-site domestic sewage treatment systems..

It is very important to properly manage and dispose of household toxics to keep your family safe and to prevent pollutants to runoff. Did you know that oil and grease from automotive maintenance; paint, masonry and cleaning wastes from home repairs and maintenance; pesticides and fertilizers from garden care are all considered household toxics? Oil and grease wastes from leaking car engines and maintenance and repair activities may contain a wide variety of toxic hydrocarbon compounds and metals at varying concentrations, and that exposure may be toxic to aquatic plants and organisms. Other wastes may be poured into storm drains or pollute runoff from maintenance activities conducted by homeowners, including paint and masonry wastes, solvents, detergents from car wash activities, residues from carpet cleaning and pool and spa care. Call the Household Toxics Hotline, (800) 246-1233, for free disposal options available in your area.

Household Toxics



Improper disposal of household toxics into stormwater can endanger aquatic habitat. For example, using excessive amounts of pesticides and fertilizers during landscape maintenance can contribute nutrients, such as nitrogen and phosphorus, and toxic organic substances, such as organophosphates and carbamates, into stormwater. Toxic materials can damage aquatic life and nutrients can result in excessive algae growth in waterways, leading to cloudiness and a reduced level of dissolved oxygen available to aquatic life. And unionized ammonia (nitrogen form) can kill fish.

Pesticides and Fertilizers

Litter and Debris

It is also important to properly dispose of litter and debris, including cigarette butts and green waste (leaves and grass clippings from landscape maintenance activities). Decaying organic matter reduces the amount of dissolved oxygen available to aquatic life. Litter and debris can plug up storm drains and reduce the aesthetic quality of the receiving waters.

Human pathogens

Human pathogens (bacteria, parasites and viruses) can also pollute runoff! Common sources of human pathogens are improperly managed pet wastes and on-site domestic sewage treatment systems. High levels of coliform bacteria in stormwater, which are used as an indicator of fecal contamination and the potential presence of pathogens, may eventually contaminate waterways and lead to beach closures. Decomposition of pet wastes discharged to receiving waters also demand a high level of oxygen, which reduces the amount of dissolved oxygen available to aquatic life.

You can help control runoff pollution by doing the following:

- Do not dispose of liquids or other materials to the storm drain system
- Report illegal dumping of any substance (liquids, trash, household toxics) to the County's toll free, 24-hour hotline 1-888-846-0800
- Utilize the County Household Toxics Program at (800) 246-1233, for disposal of household toxics
- Keep lawn clippings and other landscaping waste out of gutters and streets by placing it with trash for collection or by composting it
- Clean up and properly dispose of pet waste. It is best to flush pet waste. Alternatives to flushing are placing into trash or burying it in your yard (at least 3-ft deep).
- Observe parking restriction for street sweeping.
- Wash automobiles at car washes or on pervious surfaces (lawns) to keep wash water out of the storm drain system.
- Avoid excessive or improper use or disposal of fertilizers, pesticides, herbicides, fungicides, cleaning solutions, and automotive and paint products.
- Use biodegradable, non-toxic, and less toxic alternative products to the extent possible.
- Cover garbage containers and keep them in good repair.
- Sweep sidewalks instead of hosing down.
- Water lawn properly to reduce runoff.

For more information, please call the County Stormwater hotline
(619) 338-2048 or toll-free (888) 846-0800

Comments/Suggestions? Email: swdutyeh@sdcounty.ca.gov

Back

Automotive Fluids

When it rains or when water flows out of yards or over pavement, it flows directly into storm drains. Many people mistakenly believe this water gets "cleaned" before reaching waterways. The sewer system and the storm water conveyance systems (drains, inlets, and catch basins) are separate; they are not connected. Sewer water gets treated, but everything that washes into the storm water conveyance system goes untreated directly into our rivers, creeks, bays and ocean. This causes beach closures and postings due to contamination. Releasing pollutants into the storm water collection system is a violation of the City Municipal Code, (43.0301). Whether you are at home, work, or play there are ways that residents and businesses alike can "Think Blue" and prevent pollutants from reaching our waterways.

Most of us don't think of our car as a source of beach pollution-- but it is.

The reality is vehicles are a necessity today, and we don't have a lot of choice about that. However, we can be more environmentally responsible and choose the method(s) of caring for and repairing our vehicles in a more ocean friendly way.

Many automotive fluids – Motor Oil, Anti-Freeze, Transmission Fluids, De-Greasers, Solvents and the like are hazardous wastes. They are hazardous to you and me and toxic to our environment. No one wants to swim in them. So, make sure to prevent them from entering our storm water conveyance system.

Automotive Maintenance and Repair: When making repairs or performing minor maintenance on your vehicle, make sure you have protected the sidewalk, curb, street and gutter from repair fluids before beginning work. Identify the nearest storm drain and take steps to protect it from the fluids.

When changing fluids, collect the substance and other automotive materials in seal able containers. Mark the containers. Never mix different substances in one container. Store the containers in a secure location out of reach of children, animals and out of contact with water.

Where to Take the Pollutants:

Motor oil, Oil filters, anti-freeze and non-leaking auto batteries are accepted at the City of San Diego Used Oil and Filters Collection Events. Call (619) 235-2105 for event information.

For other automotive fluids such as transmission and brake fluids, de-greasers, solvents and the like, call the City's Household Hazardous Materials Program (619) 235-2111, to make an appointment to drop-off the pollutants.

Leaking Vehicles: If your vehicle is leaking fluids, please make repairs as soon as possible. A short-term, immediate solution is to put an oil drip pan with absorbent materials under your vehicle wherever it is parked (work, home and other destinations). Until the repair is made, you must capture the leak and prevent fluids from reaching the street or gutter where it can be carried into the storm drain conveyance system and into our waterways and beaches.

Other Fact sheets that may pertain to your activities: *Cleaning Impervious Surfaces (High Pressure Washing); Be A Clean Water Leader: Control, Contain & Capture; Spills; and Car Washing.*

Adopt these behaviors and help Clean up our beaches and bays. Think Blue, San Diego. For more information, call (619) 235-1000, or log on to: www.thinkbluesd.org (03/05/02)

Car Washing

When it rains or when water flows out of yards or over pavement, it flows directly into storm drains. Many people mistakenly believe this water gets "cleaned" before reaching waterways. The sewer system and the storm water conveyance systems (drains, inlets, and catch basins) are separate; they are not connected. Sewer water gets treated, but everything that washes into the storm water conveyance system goes untreated directly into our rivers, creeks, bays and ocean. This causes beach closures and postings due to contamination. Releasing pollutants into the storm water collection system is a violation of the City Municipal Code, (43.0301). Whether you are at home, work, or play, there are ways that residents and businesses alike can "Think Blue" and prevent pollutants from reaching our waterways.

Most of us don't think of our car as a source of beach pollution-- but it is. The reality is vehicles are a necessity today, and we don't have a lot of choice about that. However, we can be more environmentally responsible and choose the method(s) of caring for and washing our vehicles in an ocean friendly way. Car washing is a pollution problem because many metals and automotive fluids are washed off with the soapy water, travel down the gutter collecting more street pollutants, then enter our storm water conveyance system and spill into our waterways and bays.

Residential/Non-Commercial Vehicles: The Municipal Code allows for the washing of residential vehicles for non-commercial purposes. While washing of your vehicle is allowed, washing-off pollutants from your vehicle such as paint, oils, sediment, debris and such like pollutant(s) is illegal. This is why we encourage that you wash your personal vehicle without creating runoff. When washing is done at home, pollution can be minimized by washing the vehicle on the lawn or over a landscaped area to absorb the liquid and limit runoff from your property. Or, limit runoff by using a bucket and rag to wash your car and a control nozzle on your hose to rinse the car. By actively reducing the amount of water used you are not only protecting our ocean, but helping to conserve water and reducing your water bill.

Charity Washes: may be conducted as long as they are staged in a manner which avoids or minimizes the discharge of pollutants- soap, sediment, water that may be contaminated from automotive fluids and residues. Start by locating all storm drain inlets on, near or downstream of the wash site and sweeping up all sediment and debris in the area prior to washing the vehicles. On the day of the event, place sandbags or other blocking devices in front of the inlets to prevent wash water from entering the storm drain conveyance system. Any remaining standing wash water is to be swept or wet-vacuumed into a landscaped area or into the sanitary sewer system. We recommend the site and inlets be swept at the end of the wash event.

Illegal Washing Activities: Car dealerships, auto detailers, rental agencies and other automotive related businesses that wash vehicles for commercial purposes must prevent the dirty water from entering the storm water conveyance system. All washing activity for commercial purposes must control, contain and capture the wash water before it leaves the site and/or enters a storm drain or a conveyance system. Failure to do so is illegal.

Washing of all vehicles (residential and commercial) that carry items or substances that have a potential to discharge the following pollutants: paint, oils, sediment, yard waste, construction debris, chemicals, hazardous wastes and other pollutants—is illegal.

Adopt these behaviors and help Clean up our beaches and bays. Think Blue, San Diego.
For more information, call (619) 235-1000, or log on to: www.thinkbluesd.org (03/05/02)

Impervious Surfaces: Cleaning Sidewalks, Pavements, Patios, Parking Lots & Driveways

When it rains or when water flows out of yards or over pavement, it flows directly into storm drains. Many people mistakenly believe this water gets "cleaned" before reaching waterways. The sewer system and the storm water conveyance system (drains, inlets and catch basins) are separate; they are not connected. Sewer water gets treated, but everything that washes into the storm drain goes untreated directly into our rivers, creeks, bays and ocean. This causes beach closures and postings due to contamination. Releasing pollutants into the storm water conveyance system is a violation of the City Municipal Code (43.0301).

We all like clean public areas, but High Pressure Washing and Hosing Down of sidewalks not only contributes to ocean pollution, but wastes one of our most valuable resources – Water. It's not the water that's a problem. It's the pollutants it picks-up off of surfaces that are. In the City of San Diego, **High Pressure Washing or Hosing Down** surfaces in the public right-of-way will only be allowed when the following **Storm Water Best Management Practices** are used:

Before beginning to wash impervious surfaces, sweep and pick up the debris or trash in the area being washed, and in the curbside between the activity and downstream storm drain inlet(s). Properly dispose of the debris.

Storm drain inlet(s) must be protected from the water flow and the pollutants it carries. Locate the nearest downstream storm drain inlet before beginning work. Cover the inlet with fabric cloth and weigh it down with gravel bags. The debris caught in the fabric cloth can then be thrown in the trash.

Hosing pavement in a parking lot and letting it leave the site is not allowed. Water used to clean gas stations, automotive repair, driveway, street or any surface where motor vehicles are parked or driven must be recaptured (wet-vacuumed or mopped) and properly disposed of.

Sweep-up and properly dispose of all sediments that accumulate as a result of the activity.

Disinfectants, solvents, and other household chemicals used to aid in the cleaning process must be recaptured (mopped up or wet vacuumed) before hosing down.

Dry clean up methods (vacuum, sweep, and absorbents) are recommended for spills and outdoor cleaning. Where water is needed, use a mop. If hosing down is desired, follow the Best Management Practices listed above.

Dispose of mop water into the sanitary sewer system. That means down the sink drain, not the storm drain.

High pressure washing or hosing of private property must be contained, recaptured and properly disposed. Direct the water into planters, don't allow it to wash into the storm drain inlet.

Other fact Sheets that may pertain to your activities: *Be A Clean Water Leader: Control, Contain & Capture; Spills; Dumpsters, and Restaurants.*

Adopt these behaviors and help Clean up our beaches and bays. Think Blue, San Diego. For more information, call (619) 235-1000, or log on to: www.thinkbluesd.org (03/05/02)

Homeowners can significantly reduce the volume of wastewater discharged to home septic systems and sewage treatment plants by conserving water. If you have a septic system, by decreasing your water usage, you can help prevent your system from overloading and contaminating ground water and surface water. (Seventy-five percent of drainfield failures are due to hydraulic overloading.)

- Use low-flow faucets, shower heads, reduced-flow toilet flushing equipment, and water saving appliances such as dish and clothes washers. (See table on water savings possible with conservation devices.)
- Repair leaking faucets, toilets, and pumps.
- Use dishwashers and clothes washers only when fully loaded.
- Take short showers instead of baths and avoid letting faucets run unnecessarily.
- Wash your car only when necessary; use a bucket to save water. Alternatively, go to a commercial carwash that uses water efficiently and disposes of runoff properly.
- Do not over-water your lawn or garden. Over-watering may increase leaching of fertilizers to ground water.
- When your lawn or garden needs watering, use slow-watering techniques such as trickle irrigation or soaker hoses. (Such devices reduce runoff and are 20-percent more effective than sprinklers.)

Other Areas Where You Can Make a Difference

- Clean up after your pets. Pet waste contains nutrients and pathogens that can contaminate surface water.
- Drive only when necessary. Driving less reduces the amount of pollution your automobile generates. Automobiles emit tremendous amounts of airborne pollutants, which increase acid rain; they also deposit toxic metals and petroleum byproducts into the environment. Regular tuneups and inspections can help keep automotive waste and byproducts from contaminating runoff. Clean up any spilled automobile fluids.
- Recycle used oil and antifreeze by taking them to service stations and other recycling centers. Never put used oil or other chemicals down stormdrains or in drainage ditches. (One quart of oil can contaminate up to two million gallons of drinking water!)

Community Action

- Participate in clean-up activities in your neighborhood.
- Write or call your elected representatives to inform them about your concerns and encourage legislation to protect water resources.
- Get involved in local planning and zoning decisions and encourage your local officials to develop erosion and sediment control ordinances.
- Promote environmental education. Help educate people in your community about ways in which they can help protect water quality. Get your community groups involved.

For more information on how you can help, contact your

State Water Quality Coordinator

or

Local Cooperative Extension Officer.#

(Goo is an Environmental Protection Specialist in EPA's Nonpoint-Source Control Branch.)

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APPENDIX D

ESTIMATED OPERATION AND MAINTENANCE COSTS FOR THE PILOT BMP PROJECT TABLE, COUNTY OF SAN DIEGO

Estimated O & M Costs for the Pilot BMP Project

Estimated O & M Costs for the Pilot BMP Project										
ROUTINE ACTIONS	FIELD MEASUREMENT INDICATOR	MEASUREMENT FREQUENCY	MAINTENANCE ACTIVITY	Per. Hrs.			Equipment			Total Cost
				Labor	Rate	Cost	Type	Days	Rate	
BIOFILTER - STRIPS and SWALES	Average vegetation height exceeds 12 inches, emergence of trees, or woody vegetation	Once during wet season, once during dry season (dependent on growth)	Cut vegetation to an average height of 6 inches	20	43.63	872.6	one-ton truck	2	26.84	53.68
Preventive Maintenance and Routine Inspections	Height of vegetation	Visual inspection of vegetation throughout strip/swale	Remove any trees, or woody vegetation.				string trimmer, rake, tor, bags safety equipment			50
		Visual inspection of strip/swale. Prepare a site schematic to record location and distribution of barren or browning spots to be restored. File the schematic for assessment of persistent problems.	Assess quantity needed each year late wet season and late dry season.				one-ton truck			976.28
		Less than 90 percent coverage in strip invent/swale or less than 70 percent on swale side slope	Reseed/revegetate barren spots by Nov.	8	43.63	349.04	hydroseeder	1	48.15	48.15
			Scatter area to be restored to a depth of 2 inches. Restore side slope coverage with hydroseed mixture.	0	43.63	0	one-ton truck	0	26.84	0
			If after 2 applications (2 seasons) of reseeding/revegetating and growth is unsuccessful both times, an erosion blanket or equivalent protection will be installed over eroding areas							0
			During routine trashing, per District schedule	0	43.63	0	one-ton truck	0	26.84	0
			Remove litter and debris.	0	0	0	blanket			0
			Notify engineer to determine if reggrading is necessary. If necessary, regrade to design specification and revegetate swale/strip. If reggrading is necessary, the process should start in May. Revegetate strip/swale in Nov. Target completion prior to wet season.				seed, testing and disposal of sediment			once every three years
			Inspect for debris accumulation	None						300
			Debris or litter present							1046.23
			Sediment at or near vegetation height, channeling of flow, inhibited flow due to change in slope.				one-ton truck			
			Inspect for accumulated sediment	Annually			hydroseeder	1	48.15	48.15
			Visual observation							0
			Notify engineer to determine if reggrading is necessary. If necessary, regrade to design specification and revegetate swale/strip. If reggrading is necessary, the process should start in May. Revegetate strip/swale in Nov. Target completion prior to wet season.	None	2	43.63	87.26			87.26

Estimated O & M Costs for the Pilot BMP Project

Estimated by: City of Tesoro based on values obtained from Caltrans Maintenance Division					Per. Hrs	Labor Rate	Cost	Equipment Type	Days	Cost	Materials Item	Cost	Total Cost	Comments	
Inspect for burrows	Burrows, holes, mounds and inlet structures, outlet structures, side slopes or other features damaged, significant erosion, emergence of trees, woody vegetation, fence damage, etc.	Visual observation	Annually and after vegetation trimming	Where burrows cause seepage, erosion and leakage backfill firmly.	0	0	0	one-ton truck	0	0	0	0	0	0	
General Maintenance Inspection	Semi-Annually, late wet season and late dry season.	Visual observation	Corrective action prior to wet season. Consult engineer if an immediate solution is not evident.	Remove any trees, or woody vegetation.	16	43.63	698.08	one-ton truck	2	26.84	53.68	203.66	500	751.76	
TOTAL BIO FILTER AND SWALES				Includes all the above plus the following:	62	2705.06									
Inspect for standing water	Water accumulation in spreader ditch	Standing water in spreader ditch	De-water the spreader ditch to a depth of less than 0.25 inches. If sediment impedes the de-watering activity, then move or remove that portion of the sediment. Characterize and properly dispose.	Within 72 hours after a storm event (no more than 0.75 inches or greater.)	3	43.63	130.89	0	0	0	0	0	0	0	
			De-water the spreader ditch to a depth of less than 0.25" by removing the bypass plug and allowing the water to drain into the infiltration trench. Use care to prevent sediment from discharging into the infiltration trench. Replace the bypass plug once the de-watering has been completed.	At the end of the wet season, remove the bypass plug and allow the spreader ditch to drain. Use care to prevent sediment from discharging into the infiltration trench. Remove, characterize, and dispose of sediment from the spreader ditch. Replace the bypass plug before the beginning of the wet season.	6	43.63	261.78	0	0	0	0	0	261.78		
TOTAL BIO STRIP WITH SPREADER DITCH					2	43.63	87.26	sedan	1	21.28	21.28	testing & disposal costs	200	308.54	
CONTINUOUS DEFECTIVE SEPARATION (CDS) UNITS	Preventive Maintenance and Routine Inspections				65	2835.95									
DESIGN CRITERIA,	Maintenance Indicator	Field Measurement Frequency	Site-Specific Maintenance Activity												
ROUTINE ACTIONS	Inspect sump for accumulation of material.														

Estimated O & M Costs for the Pilot BMP Project

Estimated by: Cid Tesoro based on values obtained from Caltrans Maintenance Division					Estimated O & M Costs for the Pilot BMP Project						
					Per. Hrs.	Labor Rate	Cost	Type	Equipment Days	Cost	Comments
Or When the sump is 50% full during two consecutive monthly inspections.					0		0		0	0	
Annually in May, effect cleaning within 15 days					0		0		0	0	
Inspect weir box for accumulation of material.	Presence of trash and debris	Visual observation	Monthly during the wet season	Remove trash and debris while onsite conducting inspection.	72	43.63	3141.36	one-ton truck & vacitor	3	198.76	596.25 testing & disposal costs
Inspect for standing water. (Include with all of inspection)	Standing water in sump	Visual observation	Annually, 72 hours after target2 storm (0.75 in)	If standing water cannot be removed or remains through the wet season notify VCD.	0	0	0		0	0	Hours accounted for during inspections
Inspect the screen for damage and to ensure that it is properly fastened.	Screen becomes clogged, damaged or loose	Visual observation	Annually before wet season.	Clean screen.	None	0	0		0	0	Hours accounted for during inspections
Holes in screen, large debris damage to housing or weir box		Visual observation	Annually or after a course of action, effect repairs prior to the wet season.	Immediately consult with engineer and manufacturer's representative to develop a course of action, effect repairs prior to the wet season.	None	0	0		0	0	Hours accounted for during inspections
TOTAL CDS UNITS					72	3141.36			0	596.25	
DRAIN INLET INSERTS – FOSSIL FILTER	Preventive Maintenance and Routine Inspections									1800	5537.61
DESIGN CRITERIA,	ROUTINE ACTIONS	Maintenance Indicator	FIELD MEASUREMENT	MEASUREMENT FREQUENCY							
Inspect for debris/trash	Sufficient debris/trash that could interfere with proper functioning of insert	Visual observation	During the wet season:	During the wet season:	43.63	0			0		
<input type="checkbox"/> Before and once during each target2 storm (0.25 in) event	Absorbent granules dark gray, or darker, or unit clogged with sediment.	Visual observation	<input checked="" type="checkbox"/> At the end of each target2 storm (0.25 in) event	Remove and properly dispose of debris/trash. Target completion period while onsite conducting inspection.	18	43.63	785.34				785.34
Oil and grease removal	Broken or otherwise damaged insert	Visual observation	<input checked="" type="checkbox"/> Twice per year in October and May.	Replace Fossil Filter™ adsorbent within 10 working days. Characterize and properly dispose spent media prior to wet season.	2	43.63	87.26		0		87.26
Inspection for structural integrity	End of wet season, April 30	None	Annually, in May	Replace insert or immediately consult vendor to develop course of action, effect repairs within 10 working days	None	2	43.63	87.26	0		87.26
Annual renewal of medium				Remove, characterize, and properly dispose of media a Replace media before Oct 1	None	2	43.63	87.26	sedan	1	2128
											223.56
											115

Estimated O & M Costs for the Pilot BMP Project

Estimated by: Cid Tesoro based on values obtained from Callians Maintenance Division		Division						Division						Division						Division							
		Per. Hrs.		Labor Rate		Cost		Type		Days		Equipment rate		Cost		Item		Materials		Total Cost							
ROUTINE ACTIONS	INDICATOR	FIELD MEASUREMENT FREQUENCY	MEASUREMENT REQUIREMENTS	Maintenance Activity	Per. Hrs.	Labor Rate	Cost	Type	Days	rate	Cost	Item	Materials	Total Cost	Comments	ROUTINE ACTIONS	INDICATOR	FIELD MEASUREMENT FREQUENCY	MEASUREMENT REQUIREMENTS	Maintenance Activity	Per. Hrs.	Labor Rate	Cost	Item	Materials	Total Cost	Comments
TOTAL DRAIN INLET INSERTS-FOSSIL FILTERS																											
DRAIN INLET INSERTS - STREAM GUARD	Preventive Maintenance and Routine Inspections																										
DESIGN CRITERIA,																											
Sediment removal	Sediment more than 6-inches	Visual inspection of sediment collected within insert	During the wet season:	Replace insert Target completion while onsite conducting inspection.	0																						
Inspect for debris/rash	Sufficient debris/rash that could interfere with proper functioning of insert	Visual observation	During the wet season	Remove and dispose of debris/rash. Target completion period while onsite conducting inspection.	0																						
When oil absorbent polymer becomes saturated with oil	Signs of tips, gashes, and/or fallen media	Visual observation	Twice per year in October and May. Annually, in May	Within 10 working days replace oil absorbent poly fiber. Consult vendor to develop a course of action, effect repairs within 10 working days. Remove characterz, and properly dispose of media.. Replace media before Oct 1	2	43.63	87.28																				
Oil and grease removal	End of wet season April 30	None			2	43.63	87.28																				
Inspection for structural integrity	Average vegetation height greater than 12-inches, emergence of trees or woody vegetation	Visual observation and random measurements through out the side slope area	Once during wet season, once during dry season.	Cut vegetation to an average height of 6-inches and remove trimmings. Remove any trees, or woody vegetation.	48	43.63	2094.24	one-ton truck & hydroseeder	2	26.84		53.68	safety equipment														
EXTENDED DETENTION BASINS	Basin side slope planted for erosion protection and planted invert	Evidence of erosion	October each year	Reseed/revegetate barren spots prior to wet season. Contact environmental or landscape architect for appropriate seed mix. Scuff surface if needed.	0	43.63	0	0	48.16	0	seed	150		150													
ROUTINE ACTIONS	DESIGN CRITERIA,																										
Slope stability																											

Estimated O & M Costs for the Pilot BMP Project

Estimated O & M Costs for the Pilot BMP Project

Estimated by: Cid Tesoro based on values obtained from Caltrans Maintenance Division											
					Per. Hrs	Labor Cost	Type	Equipment rate	Materials Item	Total Cost	Comments
Inspect for standing water.	Standing water for more than 72 hours	Visual observation	Annually 72 hours after a large 2 storm (0.75 in) event.	<input type="checkbox"/> Drain facility, if possible. <input type="checkbox"/> Notify engineer to consider: <input type="checkbox"/> Remove sediment, scarify invert, and regrade if necessary <input type="checkbox"/> If unable to achieve acceptable infiltration rate or implement alternative solution then move to decommission <input type="checkbox"/> If standing water can not be removed then notify VCD.	16	43.63	698.08 one-ton truck	4	26.84	107.36	covered under sediment removal
Inspection for trash and debris at inlet structures	Debris/trash present	Visual observation	Measure depth at apparent maximum and minimum accumulation of sediment. Calculate average depth	<input type="checkbox"/> Sediment depth exceeds sediment accumulation marker on staff gage.	0	0			0	0	
Inspection for sediment accumulation		Visual observation	Annually	<input type="checkbox"/> Reseed/revegetate bare spots by hand. Scarify surface if needed. If after two applications (2 seasons) of reseeding/revegetating and growth is unsuccessful both times, an erosion blanket or equivalent protection will be installed over eroding areas. No erosion blanket will be installed in the basin invert!	4	43.63	174.52 hydroseeder	0.5	256.94	128.47 seed, testing & disposal	once every 10 years
Slope stability	Evidence of erosion.	Visual observation	October each year.	<input type="checkbox"/> Contact environmental or landscape architect for appropriate seed mix. <input type="checkbox"/> Where burrows cause seepage, erosion and leakage, backfill firmly.	20	43.63	872.6 hydroseeder	1	48.15	48.15 seed	275 1195.75
Inspect for burrows	Burrows, holes, mounds	Visual observation		<input type="checkbox"/> Annually and after vegetation trimming.	0	43.63	0 one-ton truck	0	26.84	0 blanked	60 60
	Inlet structures, outlet structures, side slopes or other features damaged, significant erosion, emergence of trees or woody vegetation, graffiti or vandalism, fence damage, etc.	Visual observation	Semi-Annually, late wet season and late dry season	<input type="checkbox"/> Take corrective action prior to wet season. Consult engineer if immediate solution is not evident.	20	43.63	872.6 two-ton truck	1	50	50	922.6
<u>General Maintenance Inspection</u>					108	4712.04			433.98	535 5631.02	
TOTAL INFILTRATION BASIN											
INFILTRATION TRENCHES											
Preventive Maintenance and Routine Inspections											

Estimated O & M Costs for the Pilot BMP Project

Division	Design Criteria, Routine Actions	Maintenance Indicator	Field Measurement	Measurement Frequency	Maintenance Activity	Estimated O & M Costs for the Pilot BMP Project						
						Per. Hrs	Labor Rate	Cost	Type	Equipment rate	Cost	Comments
DESIGN CRITERIA, ROUTINE ACTIONS	Inspect for standing water	Standing surface water (for more than 72 hours)	Visual observation	Annually, 72 hours after a large storm (0.75 in) event	SITE-SPECIFIC REQUIREMENTS	16.0	43.63	698.08	one-ton truck	2	26.84	53.68
	Inspect for standing water	Standing surface water (for more than 72 hours)	Visual observation	Annually, 72 hours after a large storm (0.75 in) event	Maintenance Activity	16.0	43.63	698.08	one-ton truck	0	0	751.76
	Inspect for trash and debris at inlet and outlet structures	Trash/debris present	Visual observation	During routine trash per Districts schedule.	SITE-SPECIFIC REQUIREMENTS	0	0	0	gradcall shovel, 10 yd dump trucks	0	0	0
	Inspect for sediment accumulation	Inlet structures, outlet structures, filter fabric or other features damaged, emergence of trees or woody vegetation, graffiti or vandalism, fence damage, etc.	Visual observation	Annually.	Maintenance Activity	0	0	0	gradcall shovel, 10 yd dump trucks	0	0	0
GENERAL MAINTENANCE INSPECTION	General Maintenance Inspection			Semi-Annually, late wet season and late dry seasonMonthly	SITE-SPECIFIC REQUIREMENTS	8	43.63	349.04	gradcall shovel, 10 yd dump trucks	0.066	600.00	396
TOTAL INFILTRATION TRENCHES	MEDIA FILTERS – PERLITE/ZEOLITE Preventive Maintenance and Routine Inspections			Measure with appropriate device	Maintenance Activity	8	43.63	349.04	one-ton truck	2	26.84	53.68
	DESIGN CRITERIA, ROUTINE ACTIONS	Sediment occupies 10% of the filter chamber volume.	FIELD MEASUREMENT	Annually in May.	SITE-SPECIFIC REQUIREMENTS	32	1396.16				503.36	1200
					Maintenance Activity	4	43.63	174.52	one-ton truck	1	26.84	26.84
											201.36	

Estimated O & M Costs for the Pilot BMP Project

Estimated O & M Costs for the Pilot BMP Project

Estimated O & M Costs for the Pilot BMP Project

Division	Estimated by: Cid Tesoro based on values obtained from Caltrans Maintenance Inspections	Preventive Maintenance and Routine Inspections	Design Criteria, Routine Actions	Maintenance Indicator	Measurement Frequency	Maintenance Activity	Labor			Equipment			Materials			Total Cost	Comments
							Per. Hrs	Rate	Cost	Type	Days	Rate	Cost	Item	Cost		
Drain time of 48 hours																	
Drain time exceeds 72 hours																	
Inspect for sediment accumulation in sedimentation chamber	Sediment depth exceeds marker on staff gage.	Measure with appropriate device.				Measure sediment depth annually.											
Inspect for trash / debris	Trash and debris present	Visual observation				Remove sediment prior to wet season. Characterize sediment depth annually.											
Inspect for burrows	Burrows, holes, mounds.	Visual observation				Remove and dispose of trash and debris during routine trashings.											
Inspect for standing water	Water accumulation in any structure or other location within the filter	Standing water in any structure or other location within the filter				Annual irrigation trimming.											
Inlet structures, outlet structures, filter fabric or other features damaged, emergence of vegetation, graffiti or vandalism, fence damage, etc.						<input type="checkbox"/> Where burrows cause seepage, erosion and leakage, backfill firmly.											
General Maintenance Inspection						<input type="checkbox"/> Gravity drain where possible.											
						<input type="checkbox"/> Notify engineer, if immediate solution is not evident.											
						<input type="checkbox"/> If standing water can not be removed or remains through wet season notify VCD.											Does not include Vector Control Agency costs
						Semi-Annually, late wet season and late dry season Monthly											87.26
						Within 30 working days, take corrective action. Consult engineer if immediate solution is not evident.											87.26
						Visual observation											402.72

Estimated O & M Costs for the Pilot BMP Project

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Estimated by: City Treoro based on values obtained from Caltrans Maintenance Division												
					Per. Hrs	Labor Rate	Cost	Type	Equipment Days			
								Cost	Item			
Inspect for burrows	Burrows, holes, mounds	Visual observation	If water is spilling over well, open canal gate until water level is at permanent pool elevation. Check/clear outlet of debris.	None	4	43.63	174.52	one-ton truck	1	26.84	26.84	201.36
General Maintenance Inspection Inspect Zone 1 & 4 for vegetation coverage and density to sustain vector abatement efficacy (See attachments for zone locations)	Inlet structures, outlet structures, side slopes or other features damaged, significant erosion, graffiti or vandalism, fence damage, etc.	Annually and after vegetation trimming	Where burrows cause seepage, erosion and leakage, backfill firmly.	None	4	43.63	174.52	one-ton truck	1	26.84	26.84	201.36
Inspect Zone 2 for vegetation coverage and density to sustain vector abatement efficacy	Visual, visible vegetation growth or emergent vegetation growth	Semi-Annually, late wet season and late dry season	Take corrective action, or restore to as-constructed condition prior to wet season. Consult engineers if immediate solution is not evident.	None	8	43.63	349.04	one-ton truck	2	26.84	53.68	402.72
	Observable vegetation coverage/density	Quarterly	1. Have a biologist survey the Wet Basin to determine if any birds are nesting or other sensitive animals are present. If birds are nesting, with advice from the biologist, proceed with the maintenance. 2. Lower and maintain the water level to expose the area to be maintained, do not completely drain basin			0				0		0
			3. Mechanically remove all Cut plants/vegetation 4. Dispose of the vegetation material in a landfill or other appropriate disposal area. 4.5. Restock mosquito fish as recommended by vector control agency.		4	43.63	174.52	one-ton truck	1	26.84	26.84	201.36
			Mosquito fish cannot be seen in the planted area, vegetation density approximately 80 to 100 percent	None	56	43.63	2443.28	one-ton truck	3	26.84	80.52	2623.8
			Vegetation density is such that mosquito fish cannot swim freely in the planted area.		24	43.63	1047.12	packer	3	53.44	160.32	1257.44
			Annually, or at a special request of the local vector control agency		8	70	560	sedan	1	21.28	21.28	581.28
			1. Have a biologist survey the Wet Basin to determine if any birds are nesting or other sensitive animals are present. If birds are nesting, with advice from the biologist, proceed with the maintenance.		6	70	560	sedan	1	21.28	21.28	581.28

Estimated O & M Costs for the Pilot BMP Project

NOTES:

1. The design storm event is a storm that has a one year, 24 hour recurrence frequency.

2. A target storm event is a storm greater than 0.75 inches of rainfall.

3. Vascular wetland vegetation consists of willows (*Salix* spp.), mud flat baccharis (*Baccharis salicifolia*), common cordgrass (*Spartina cynosuroides*), and western sycamore (*Platanus racemosa*). Note, this criterion is not applicable to the wet basin.

4. Zone 1, open water area of the basin, average depth is about 3 feet. Zone 2, shallow water trench, depth of water 0 - 12 inches. Zone 3, periodic inundation is the temporary water storage volume impounded between the permanent pool and the overflow weir, i.e. the water quality storage. (See attachments for zone locations). Zone A is the remaining upland slope between Zone 3 and the maintenance road.

This Maintenance Indicator Document has been developed using site specific information gathered by specialists trained in the identification of threatened and endangered species and their habitat. The recommendations provided in this document are based on the requirements of specific plant species used in this Pilot Program. The recommendations contained in this document include guidance for inspection for possible threats and guidance for maintenance activities. Further, some of the maintenance recommendations are based on the requirements of specific plant species used in this Pilot Program. The recommendations provided in this document must be reassessed with respect to species and plant materials as the guidance for maintenance activities is updated.